

COMMITTEE A COMPUTATIONAL ASPECTS OF ANALYSIS AND DESIGN OF DAMS				88 <sup>th</sup> Annual Meeting. Ottawa, 11 <sup>th</sup> June 2019			
MINUTES							
MEMBERSHIP / LISTE DES MEMBRES							
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**AGENDA OF THE TECHNICAL COMMITTEE A MEETING**

- (i) Examination of the Minutes of 2018 Annual Meeting (Vienna, Austria. 1<sup>st</sup> July, 2018).
- (ii) Approval of 2019 Agenda Items.

1. Update of the Committee membership and welcome to new representatives, by **Guido Mazzà**.

- ✓ *Welcome to new members and co-opted members: Xavier MOLIN (France), Anton TZENKOV (Bulgaria), Phoebe PERCELL (USA), Yi Liu (China), Mariyathas AJANTHINY (Sri Lanka), Graham ROBERTS (South Africa), Ehab A. KHALIL (Egypt), Eugeny VITOKHIN (Russia), Takahide KUROSE (Japan).*
- ✓ *Request of the Chairman to the ICOLD Secretariat to make corrections of the member list in the ICOLD website.*
- ✓ *Proposals will be voted by the General Assembly on Friday, 14<sup>th</sup> June.*
- ✓ *Report of the Chairman on the Committee's activity.*

2. Information about the technical and social organization of the 15<sup>th</sup> Benchmark Workshop to be held in Milan, 9<sup>th</sup> – 12<sup>th</sup> September, 2019.

Presenter: **Antonella Frigerio (Italy)**, member of the Local Organizing Committee of the 15<sup>th</sup> Benchmark Workshop.

3. Examination of the proposals received to host the 16<sup>th</sup> Benchmark Workshop (2 proposals have been received from Bulgaria and Slovenia).
  - ✓ *Proposals presented by **Anton Tzenkov** (Bulgaria) and **Mateja Klun** (Slovenia).*
  - ✓ *Open discussion to take a decision.*
4. Updating of the status of the Bulletin on “Non-linear modelling of concrete dams”.
  - ✓ *Topic presented by **Manouchehr Hassanzadeh**, leader of the working group.*
  - ✓ *Open discussion about objectives and organization of the work.*
5. Updating on the status of the Bulletin on “Capitalization of the results of past benchmarks”.
  - ✓ *Topic presented by each working group leader: **M. Meghella**, **G. Zenz**, **G. Mazzà**, **M. Hassanzadeh**, **C. Marulanda**, **I. Escuder** (Note: Meghella who cannot participate to the meeting will be replaced by Mazzà).*
  - ✓ *Open discussion about objectives and organization of the work.*
6. Preparation of the joint Bulletin on Concrete Arch Dams focusing on analysis, methodologies and associated design criteria.
  - ✓ ***Russel Gunn** and **Dan Curtis** have been involved in the Joint Workshop preparation. **D. Curtis** will report on this subject during the Committee A meeting (Note. **R. Gunn** cannot participate to the meeting).*
7. Miscellaneous aspects, by any Member.
  - ✓ *ICOLD has started to publish the ICOLD Bulletins with a professional publisher (CRC Press - Balkema). New Templates for ICOLD Bulletins are now available, by **Guido MAZZA**’.*
  - ✓ *Possible updating of the Terms of Reference of the Committee, by **any Members**.*
  - ✓ *Others, by **any Member**.*

## MINUTES OF THE MEETING HELD IN OTTAWA DURING THE 87<sup>th</sup> ICOLD ANNUAL MEETING

After having given the welcome to the Committee Members, to the New Representatives and to the Observers, the Chairman Guido Mazzà has called for the approval of the Minutes of the previous meeting held in Vienna and of the present Agenda. Both items have been approved.

1. Update of the Committee membership and welcome to new representatives, by **Guido Mazzà**.

- ✓ *The Chairman has given the welcome to the new members and co-opted members and has presented a report on the Committee's activity. The Chairman has requested to check the ToR that could be updated making a request to the ICOLD Board before March 2020 in order to possibly update them before the next ICOLD Meeting that will be held in India in 2020. The past BWs have been shortly presented as well as the next one that will be held in Milano. Some information about the old and in progress Bulletins have been provided. The Bulletin on Capitalization needs to be discussed to finalize a proper way to present all the data so far collected during the previous BWs. Some activities in collaboration with other TCs are in progress: in Ottawa the outcome of the joint meeting between TC A and D, held on Monday 10<sup>th</sup> June, was to cooperate on the preparation of the Bulletin on concrete arch dam. The Chairman finally outlined the necessity to promote a collaboration with the EURCOLD, in particular on seismic dam assessment.*

2. Information about the technical and social organization of the 15<sup>th</sup> Benchmark Workshop to be held in Milan, 9<sup>th</sup> – 12<sup>th</sup> September, 2019.

- ✓ *Antonella Frigerio (Italy), member of the Local Organizing Committee of the 15<sup>th</sup> ICOLD Benchmark Workshop, has presented the technical and organizational aspects of the event. In particular, she has presented the Themes of the Benchmark proposed by the Formulators, the technical visits at two dam sites, and the short course on seismic analyses applied to concrete dams, held by Prof. Chopra on the 4<sup>th</sup> day of the Workshop.*

3. Examination of the proposals received to host the 16<sup>th</sup> Benchmark Workshop (2 proposals have been received from Bulgaria and Slovenia).

- ✓ *Nina Humar (Slovenia), President of the SLOCOLD, and Anton Tzenkov (Bulgaria), member of TC A, have presented the candidacy respectively of Slovenia and Bulgaria to host the next BW in 2021.*

*After a wide discussion of the TC members, it has been decided to maintain a 2-year basis organization of the BWs and to have a balloting to choose the Country that will host the BW in 2021. Slovenia won the ballot with 14 votes vs 6 votes to Bulgaria. Bulgaria has decided to propose its candidacy for the 17<sup>th</sup> BW.*

4. Updating of the status of the Bulletin on “Non-linear modelling of concrete dams”.

- ✓ *Manouchehr Hassanzadeh (Sweden), leader of the working group in charge to prepare the Bulletin has presented an updating of the Bulletin whose aim is to outline when non-linear analyses are needed for concrete dams. He described the contents and updates of each chapter.*

Manouchehr mentioned in particular the good contribution given by Francisco Lopez (Australia) on the chapter about boundary non-linearity and Russel Gun (Switzerland) on the chapter related to FEM codes for NLMCD. Manouchehr presented a planning for the next steps to try to facilitate and finalize the issue of the Bulletin. Before January 24th, 2020 Manouchehr will make a check of the work done and will provide a feedback to the reference person of each chapter. The first draft will be available on February 28th, 2020. From now on every month Manouchehr will update the version of the Bulletin on the ICOLD share space.

An open discussion about the objectives and the preparation of the Bulletin has taken place that will be taken into account by the coordinator Manouchehr Hassanzadeh.

- ✓ The Chairman discussed about the time schedule of the issue of Bulletins: draft Bulletins must be circulated among the National Committees for gathering observations at least 4 months before the publication to get the approval. To prepare the French version of Bulletins, the TC A needs a support by the French mother tongue members. Gerald Zenz, vice Chair, provided information about the template of Bulletins that the ICOLD Board has defined in the frame of an agreement with Balkema editor. The Template is already available on the share space of the ICOLD website. This template has to be used to issue the new Bulletins.

5. Updating on the status of the Bulletin on “Capitalization of the results of past benchmarks”.

- ✓ The Chairman summarized the objectives of the Bulletin and the sharing of the activities to prepare it. The reference person of each chapter has presented the activities in progress.

Dam type	Problems analysed in the 14 BW					
	Static analysis & interpretation of measurements	Seismic analysis	Thermal analysis Fracture mechanics Swelling	Seepage analysis Settlement evaluation	Probabilistic analysis & risk assessment	Open themes
Concrete	1, 5, 5, 6, 7, 9, 10	2, 4, 12, 13, 14	3, 3, 4, 6, 8, 11, 14		11, 14	9 <sup>th</sup> St. Petersburg 13 <sup>th</sup> Lausanne 14 <sup>th</sup> Stockholm
Embankment	1, 4, 5, 11, 14	2, 3		3, 4, 7	13	
RCC			7, 8			
Rockfill & CFRD	5, 6, 8, 9, 10, 12					
Others		10			12	

Camilo Marulanda (Colombia) presented the activated related to embankment, rockfill and CFRD dams: a table with the main topics has been defined. The advancement of the work is about 70% and as soon as it will be completed, it will be circulated among the members and people that

*have expressed interest in supporting the initiative. The correlated papers presented in the BWs' Open Themes will be included as well. This aspect will also be followed by the other chapter coordinators.*

*Manouchehr Hassanzadeh presented the work in progress related to thermal, fracture and swelling analyses: in September the short description of the Themes will be completed as well as the synthesis of each related BWs; the critical assessment of the topics will make reference to three phenomena (mechanical, physical and chemical) and the draft version of the chapter will be available on November; finally, the chapter about the main shortcoming of this type of analyses will be defined.*

*Mateja Klun (Slovenia) on behalf of Massimo Meghella (Italy), presented a table that will summarize the BWs content related to static analyses and measurement interpretation. The table will be filled in next months within the end of 2019.*

*Gerald Zenz will follow the Camilo and Manouchehr approach and he has committed to prepare a draft that synthesize the BWs papers related to seismic analyses before the end of 2019.*

*The chapter related to risk assessment has been completed yet under the supervision of Ignacio Escuder Bueno (Spain).*

- ✓ *The expectation of the Chairman is to have a draft version of the Bulletin ready for the ICOLD Annual Meeting that will be held in Delhi.*

6. Preparation of the joint Bulletin on Concrete Arch Dams focusing on analysis, methodologies and associated design criteria.

- ✓ *Russel Gunn and Dan Curtis (Canada) have been involved in the Joint Workshop between TC A and TC D, held on Monday 10<sup>th</sup> June. During the joint meeting, Dan Curtis has reported on seismic analyses related to arch dams.*
- ✓ *The Chairman shortly presented in which BWs of TC A concrete arch dams were investigated with reference with different aspects (static, seismic, thermal problems, abutment stability, etc.). Dun Curtis summarized what has been presented in the Joint Workshop with TC D. It could be taken into account that also several ICOLD Bulletin, issued so far, contain information about concrete arch modelling as well. Other members of TC A have expressed their interest to contribute to the activities of the joint working group.*

7. Miscellaneous aspects, by any Member.

- ✓ *ICOLD has started to publish the ICOLD Bulletins with a professional publisher (CRC Press - Balkema). New Templates for ICOLD Bulletins are now available on the share space of the ICOLD website.*
- ✓ *The TC A ToR will expire in 2020 and they could be postponed or changed providing information to the ICOLD Board 4 months before the ICOLD Annual Meeting in India. The Chairman will send an email to all Members to ask a feedback.*
- ✓ *According to the number of the TC A members that will participate to the 15<sup>th</sup> ICOLD Benchmark Workshop in Milan, the Chairman will organize a Committee meeting to discuss about the activities in progress.*

B) SEISMIC ASPECTS OF DAM DESIGN				B) ASPECTS SISMIQUES DES PROJETS DE BARRAGES	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in Ottawa, Canada, June 11, 2019				Réunion à Ottawa, Canada, 11 juin 2019	
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
Switzerland	WIELAND	M.	Chairman	P	
China	WANG	H.	Member	P	
Japan	SASAKI	T.	Member	P	
Algeria	BENSEGHIER	K.	Member		A
Argentina	CARMONA	J.	Member		A
Australia	LANDON-JONES	I.	Member		A
Austria	ZENZ	G.	Member		A
Bulgaria	PETKOV	M.	Member		A
Canada	ADDO	K.	Member	P	
Chile	RAMOS	F.	Member		A
Colombia	MARULANDA	C.	Member		A
Costa-Rica	CLIMENT	A.	Member	E. CAMPOS	
Ethiopia	AMAN	A.	Member	P	
Egypt	RASHED	A.	Member	P	
Form. Yug. Rep. of Macedonia	PETKOVSKI	L.	Member		A
France	LIGNIER	P.	Member	E. ROBBE	
Germany	TERHEIDEN	K.	Member	P	
Greece	PAPADIMITRIOU	A.	Member		A
India	VISHNOI	R.K.	Member	P	
Iran	JAFARI	M.K.	Member		A
Italy	CARUANA	R.	Member	P	
Korea	KIM	D.-S.	Member		A
Malaysia	AZLAN	A.	Member		A
Mexico	ROMO	M.	Member		A
New Zealand	MATUSCHKA	T.	Member	P	
Norway	HOEG	K.	Member	P	
Pakistan	JUNAID	Ahmed	Member		A

Portugal	SECO e PINTO	P.S.	Member		A
Russia	BUGAEVSKY	A.	Member		A
Serbia	To be nominated		Member		A
Spain	BLAZQUEZ PRIETO	F.	Member		A
Thailand	HARNPATTANAPANICH	Thanu	Member		A
Turkey	ERDIK	M.	Member		A
United Kingdom	SPASIC-GRIL	L.	Member	J. HINKS	
United States	MEJIA	L.	Member	P	
OBSERVERS : more than 35 observers from Canada (21), China (2), France, Germany, India, Indonesia (2), Japan, Norway, South Korea, Switzerland (2), USA					

## Agenda

### 1. Information by Chairman

- (i) Meetings and attendance: Two meetings were held on June 11, 2019 from 8.30 a.m. to 16.15 p.m.; 15 committee members including 3 substitutes and over 35 observers were present.
- (ii) A. Rashed joined as new member from Egypt and R.K. Vishnoi joined as new member replacing A.B. Pandya from India. The Serbian National Committee still has to nominate a new member. No contacts could be established with the committee members from Algeria and Pakistan and members from Argentine, Costa Rica, Mexico, and Portugal have not been able to participate for several years. Sri Lanka will join as new country and has nominated B. Kendaragama.
- (iii) The Term of Office of the Committee ends in 2020.
- (iv) The position paper on dam safety and earthquakes, approved in 2010, will finally be published in 2019.
- (v) All committee members shall obtain a code from their national committees in order to get free access to all ICOLD Bulletins and other documents from the ICOLD web page. Starting 2018 Balkema is publishing the ICOLD Bulletins. The new Bulletins will be on the Balkema webpage and the members have to get another password for free access and download of the new Bulletins. The old ones, published prior to 2018, are still available on the ICOLD webpage.
- (vi) New templates shall be used for the preparation of new bulletins. There is still a considerable back log in the publication of approved bulletins, resulting mainly from the delay of the French translations. Our committee is not affected by this back log.
- (vii) A Question for ICOLD Congress in Marseilles, France, 2021 was proposed by the Committee on Seismic Aspects of Dam Design and sent to the Secretary General of ICOLD in February 2019. A vote will be taken at the general meeting in Ottawa.
- (viii) Communication with the committee members will be by email only. In the past year some 40 documents including reports on recent earthquakes, papers and various announcements were distributed to the members and also the past committee members.

(ix) The Ottawa Meeting is the **20<sup>th</sup> meeting** of M. Wieland as Chairman of the Committee on Seismic Aspects of Dam Design.

## **2. Selected Reports from Committee Members**

Different reports were presented by the representatives from China, France, Italy, Japan, Switzerland, and USA. Copies of the ppt presentations will be forwarded to the committee members by separate mail. The committee appreciates the support from the seismic committee of the USSD as their terms of reference are in line with those of our ICOLD committee and related documents are under preparation.

Besides the reports on recent earthquakes in Italy, Japan and the USA, a report on the experimental (shaking table tests of dam-reservoir-foundation model) and numerical (nonlinear dynamic analyses) investigations of the ultimate seismic behaviour of very high arch dams in China was presented.

## **3. Discussion of Terms of Reference**

### **3.1 Interpretation of seismic data obtained from dams** (Coordinator: Sasaki)

An update of the status of the draft bulletin was given by Sasaki, who presented a new Chapter 6, which includes studies done by Japanese researchers using data recorded at Aratazowa rockfill dam (peak ground acceleration (PGA) of 1.0 g), Kasho gravity dam (PGA 0.5 g) and other embankment dams. It was proposed that these studies be reviewed by Mejia and Matuschka. The proposed Chapter 6 provides useful information on the assessment of the behaviour of dams subjected to strong ground shaking. Additional studies from Italy (Caruana) and the USA (Mejia) shall be added. Sasaki will prepare the updated bulletin, which includes the previous chapters with the combined international and Japanese data, the statistical evaluation of this data done by Matsumoto and amended by Sasaki and the new Chapter 6. This work shall be completed before the end of 2019.

In the discussion it was recognised that the extraction of the damping ratio from the strong motion data recorded at the base and on the crest of Japanese dams using the simple half-band-width method is not unproblematic, as there is considerable scattering in the damping ratios. For more reliable damping values, more advanced time series analysis methods have to be used. But there are limitations in accuracy when strong motion data is only available in two points of the dam (see also Section 4 (ii)).

A presentation of a data base of strong motion data recorded at dam sites and software for the analysis of acceleration records was presented by Robbe. Most of the data is from Japan. The records compiled by JCOLD are very useful and besides France they have already been used by researchers in Korea and Austria.

An earthquake data base on earthquakes and dams has also been developed by McCann of Stanford University, USA.

**3.2 Seismic design aspects of CFRD dams, dams with asphalt core, and dams with other types of liners and internal membranes** (Hoeg, Marulanda and Matsumoto): No new documents have been prepared; however, a draft bulletin shall be ready for the next meeting in New Delhi.

**3.3 Nonlinear seismic analysis procedures for concrete and embankment dams:** An overview conference paper was prepared by Wieland, which was distributed to the committee members. This document should be prepared together with Committee A (computational committee). Marulanda, Zenz and Terheiden are also members of Committee A. This bulletin will be included in the future terms of reference.

USSD is working on a document on the nonlinear dynamic analysis of embankment dams, which will be available until the end of 2019. This document shall form the basis for a similar ICOLD Bulletin of our committee.

### **3.4 Dissemination of information on seismic aspects of dams** (all)

Since the annual meeting in Vienna, the Chairman has delivered one-day or two-day short courses/training courses and seminars on dam safety and earthquakes as follows: Philippines (4 courses, ca. 700 participants), India (4), and Cambodia.

The committee members are encouraged to disseminate the documents prepared by the committee in their countries by means of workshops, training courses, papers and the preparation of country-specific guidelines.

#### **4. Items of Concern**

The following items are still of concern:

- (i) Seismic safety of existing dams: This is a long-term ongoing process; all countries are recommended to check the seismic safety of their dams designed by the pseudo-static analysis method using a seismic coefficient of typically 0.1, as this method is outdated today and shall no longer be used. Japan is carrying out a reassessment of the seismic safety of dams. A paper on the seismic safety re-evaluation of dams in Switzerland was distributed, which could serve as an example on how such a safety evaluation program can be carried out.
- (ii) Damping characteristics of concrete dams: This is an unresolved and controversial issue, as damping ratios obtained from small-amplitude oscillation measurements are much smaller than the values used in dynamic analyses of concrete dams; the damping ratio is the main material factor controlling the linear dynamic response of concrete dams.

#### **5. Proposal for future terms of reference**

The following subjects were discussed:

- (i) Seismic aspects of safety-critical electro-mechanical and hydro-mechanical equipment.
- (ii) Nonlinear seismic analysis of dams,
- (iii) Seismic deformation analysis of dams (USSD), and
- (iv) Seismic design and safety aspects of tailings dams.

#### **6. Coordination with other Technical Committees, who are concerned with seismic safety aspects**

- (i) Contact with Committee A (Computational Aspects of Analysis and Design of Dams): Zenz, Marulanda and Terheiden (nonlinear dynamic analysis of dams).
- (ii) Contact with Committee V (Hydro-mechanical Equipment): Landon-Jones.
- (iii) Contact with Committee LE (Levees): to be decided.
- (iv) Contact with Committee L (Tailings Dams and Waste Lagoons): to be decided.

#### **7. Other items**

- (i) The Chinese earthquake code on Hydraulic Structures will be translated into English.
- (ii) A review of the draft bulletin on Selection of Dam Types was submitted by the Chairman as it includes sections dealing with seismic design aspects.

**C) COMMITTEE ON HYDRAULICS FOR DAMS****PROGRESS REPORT**

MEETING in Ottawa, 11 June, 2019

**C) COMITÉ HYDRAULIQUE DES BARRAGES****RAPPORT D'ACTIVITÉ**

RÉUNION à Ottawa, le 11 juin 2019

MEMBERSHIP / LIST DE MEMBRES				MEETING / RÉUNION		
TITLE	MEMBRES		COUNTRY/ PAYS	PRESENT	ABSENT	SUBSTITUTE
Chairman	SCHLEISS	A.	Switzerland	P		
Member	MENÉNDEZ	D.	Argentina		A	
Member	WARK	R.J.	Australia	P		
Member	ERPICUM	S.	Belgium	P		
Member	RODRIGUEZ	G.	Bolivia		A	
Member	MICOVIC	Z.	Canada	P		
Member	SPANO	M.	Czech Rep.	P		
Member	XU	W.	China		A	
Member	LAUGIER	F.	France	P		
Member	HASELSTEINER	R.	Germany	P		
Member	SEN	S.P.	India		A	
Member	ZIA	A.	Iran		A	

Member	CAGIANO	A.	Italy		A	
Member	TAKATSUKA	T.	Japan	P		
Member	KIM	H.	Korea		A	
Member	MARENGO	H.	Mexico		A	
Member	PETRY	B.	Netherlands		A	
Member	KJELLESVIG	H-M. (Mrs)	Norway	P		
Member	WRIGHT	H-J.	South Africa	P		
Member	GRANADOS	A.	Spain	P		
Member	YANG	J.	Sweden	P		
Member	YAPA	A.	Sri Lanka	P		
Member	SHAKIROV	R.	Russia		A	
Member	PAVLOV	V.	UK	P		
Member	LINDELL	J.	United States	P		
Member	MARENGO	H.	Mexico		A	
Member	PETRY	B.	Netherlands		A	
Member	PANTA	M.R.	Nepal	P		
Member	MARCANO	A.	Venezuela		A	
Co-opted Member	BOES	R.	Switzerland		A	
Co-opted Member	SALAMON	J.	USA		A	
Co-opted Member	PINHEIRO	A.	Portugal		A	

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	ABDELLATIF	M.	EGYPT
	VALERO	D.	NETHERLANDS
	RAE	P.	CANADA
	CROOKSTON	B.	USA
	WAHL	T.	USA
	CALAMEO	S.	CANADA
	WOODWARD	D.	USA
	ARMSTRONG	S.	CANADA
	PAXSON	G.	USA
	PARKIN	N.	UK

**Agenda:**

1. Welcome message to the participant
2. Presentation of new members joining the Committee
3. Pending work for the publication of Committee
4. Discussion on the content of the chapter of the new bulletin
5. Distribution of task and deadlines
6. Final observations and other issues by Committees Members

**1. Welcome message to the participant**

President A. SCHLEISS welcomed the members and observers. He congratulated all speakers for the presentations during the workshop in the morning of the day before (June 10, 2019) and thanked all the delegates who participated to the workshop for which the feedback was very positive.

**2. Presentation of new members joining the Committee**

From Nepal: M. R Panta

Sri Lanka: A. L. S. Yapa

Belgium: A. Lejeune replaced by S. Erpicum

**3. Pending work for the publication of Committee**

- a: F. Laugier: Translation to French 95 % finalized, scheduled to be finalized by the end of the summer. Still not in the correct template. The template will be arranged by A. Granados. Plan to print by the end of this year.
- b: Still some details missing, lack some references, about risk, guidelines etc. Finalized by 80-90 %, V. Pavlov and R. Wark are working on this and plan to finalize by the end of this year so that a final version can be discussed in our meeting in April 2020.

**4. Discussion on the content of the chapter of the new bulletin (main chapter were agreed on in Vienna 2018).**

Topics:

- a. High velocity flow chutes and corresponding outlet structures (cavitation, air entrainment, waves, flow bulking, splashing)

Focus on new knowledge, theory and observations, state of the art etc.

- Air entrainment: **D. Valero**
- Air aerator design, modelling (physical and numerical modelling): **J. Yang**, with contributions from A. Zia , D. Valero and USSD prepare a short write up.
- Waves, flow bulking and splashing: **F. Laugier**
- Smooth – Stepped chutes, ongoing research, criteria, how it effects the stilling basin, examples etc.: **A. Granados**, contribution from EPFL PhD student I. Stojnic (ref A, Schleiss)

- Structural design including joints, sealing, drainage system of chute linings interacting with fluid considering dynamic loading and vibrations: Presentation of recent examples, **V. Pavlov**, contact J. Guo and W. XU, in China use the presentation contribution from H. Wright, R. Wark, G. Pawson
- b. Need of surveillance and monitoring of spillway, discussion with committee Q (after lunch)  
Committee Q: Monitoring potential failure modes, but it need that the failure modes are already identified.

Committee C will identify potential failure modes and want a guideline (not a bulletin) for investigations and procedures for inspections not necessary instrumentations. It is wanted to check the integrity of the structure or stress test the behavior during operation.

Plan workshop on this topic in the annual meeting 2020.

J. H. Wright is responsible to keep in contact with committee Q.

Presentation

A. Firoozar: *Application of a systematic integrated framework for spillway inspection and assessment*

- c. Uprating: Morphological decision book, look at possibilities and combinations, criteria for selecting design **F. Laugier**

Cases: See workshop, **F. Laugier**, J. Lindell, H. M. Kjellesvig, V. Pavlov. There will also be contributions from S. Erpicum, J. Yang, A. Granados, J. Lindell, D. Woodward

- d. Supersaturation: R. Wark will check if there are new research or information about this topic. It will be a discussion next annual meeting if this topic should be part of the new bulletin or not.

Suggestions:

- Spillways that will operate continuously (tailing dams), how to design, durability of unlined rock or concrete chute, maintenance. Conclusion discuss this with the committee on Tailing dams, this could be a separate bulletin.
- Guidelines on physical and numerical modelling. This can be included in the chapter Air aerator design, modelling (physical and numerical modelling): organized by **J. Yang** with contribution from D. Valero.

**Presentations given during the meeting** (will be uploaded to the committee Sharespace):

S. Erpicum: *Experimental study of ogee crested weir.....*

V. Pavlov: *Catchwater and water transfer hydraulics in flood estimation*

T. Wahl: *Effect of boundary layer conditions on pressures at slab joints*

**5. Distribution of task and deadlines**

Upload to Sharespace or send articles to the chairman that can be considered useful for the bulletin.

Everyone giving input to the chapters should send their contribution to the person responsible for the chapter until December 15, 2019 latest

First outline/sketch on each chapter need to be prepared by the responsible for each chapter and published on the Sharespace before the end of February 2020.

**6. Final observations and other issues by Committees Members**

None

<b>D) CONCRETE DAMS</b> NOTES OF MEETING Meeting in Ottawa, 11-June-2019 (08:30 – 16:00)					<b>D) BARRAGES EN BÉTON</b> NOTES DE LA RÉUNION Réunion à Ottawa, 11-Juin-2019	
MEMBERSHIP / LISTE DES MEMBRES					MEETING / RÉUNION	
<b><u>COUNTRIES/PAYS</u></b>	<b><u>MEMBERS/MEMBRES</u></b>				<b><u>Present</u></b>	<b><u>Absent/Substitutes</u></b>
Switzerland	CONRAD	Marco	Dr.	Chair	P	
South Africa	SHAW	Quentin	Dr.	Vice Chair	P	
Australia	FORBES	Brian	Mr.	Member		A / Peter Buchanan
Austria	PICHLER	Walter	Dr.	Member		A
Brazil	MARQUES FILHO	José	Dr.	Member	P	
Canada	COUTURIER	Francois	Mr.	Member	P	
Canada	BATTA	Vinod	Mr.	Co-opted	P	
Chile	BUSTAMENTE	Leonardo	Dr.	Member		A
China	XU	Yao	Dr.	Member		A
China	HAO	Jutao	Dr.	Co-opted		A
Egypt	EL-HAKEM	Yasser	Dr.	Member		A
France	GUERINET	Michel	Mr.	Member	P	
France	BURDIN	Jacques	Mr.	Co-opted		A
France	LAUNAY	Jean	Mr.	Co-opted/Past Vice-Chairman		A
Germany	WITTKE-SCHMITT	Bettina	Dr.	Member		A
Great Britain	DUNSTAN	Malcolm	Dr.	Member	P	
India	KAPADIA	Vivek	Mr.	Member		A
Iran	AHMADI ADLI	Shahryar	Mr.	Member	P	
Iraq	OTHMAN	Salim	Dr.	Member (corresponding)		A
Italy	BERRA	Mario	Dr.	Member		A
Italy	SACCONE	Roberto	Mr.	Co-opted	P	
Japan	YAMAGUCHI	Yoshikazu	Dr.	Member		A / Takayuki Kambe
Korea	SHIN	Yooncheol	Mr.	Member		A
Norway	ARNTSEN	Bård	Mr.	Member	P	
Norway	BERTHELTSEN	Ole (John)	Mr.	Co-opted	P (p.m.)	
Pakistan	SALIM SHEIKH	Azhar	Dr.	Member (corresponding)		A
Portugal	CAMELO	Armando	Mr.	Member	P	
Portugal	FERREIRA DA SILVA	Pedro	Mr.	Co-opted		A
Russia	ZAKHARIIN	Eugeni	Mr.	Member		A
Russia	KOSTYRYA	Sergey	Mr.	Co-opted		A

<b>D) CONCRETE DAMS</b> NOTES OF MEETING Meeting in Ottawa, 11-June-2019 (08:30 – 16:00)					<b>D) BARRAGES EN BÉTON</b> NOTES DE LA RÉUNION Réunion à Ottawa, 11-Juin-2019	
MEMBERSHIP / LISTE DES MEMBRES					MEETING / RÉUNION	
Spain	IBANEZ DE ALDECOA	Rafael	Mr.	Member	P	
Spain	MENÉNDEZ MÉNDEZ	Esperanza	Dr.	Co-opted		A
Spain	ORTEGA	Francisco	Mr.	Co-opted	P (p.m.)	
Spain	GRANELL NINOT	Carlos	Mr.	Co-opted	P (p.m.)	
Sweden	NORDSTRÖM	Erik	Dr.	Member	P	
Switzerland	AMBERG	Francesco	Mr.	Co-opted		A
Turkey	AYDOGAN	Dincer	Mr.	Member	P	
Turkey	ERGENEMAN	Isin	Ms.	Co-opted	P	
Ukraine	LANDAU	Jurij A.	Mr.	Member		A
United States	ROGERS	Michael	Mr.	Member/ICOLD President/Past Chairman	P (a.m.)	
United States	CHARLWOOD	Robin	Dr.	Co-opted/Past Chairman	P (a.m.)	
United States	HUGHES	Aled	Mr.	Co-opted	P	
United States	SALAMON	Jerzy	Dr.	Co-opted	P	
<b>OBSERVERS:</b>						
<i>Country</i>	<i>FAMILY Name</i>	<i>First</i>	<i>Greeting</i>	<i>E-mail</i>		
USA	SCHRADER	Ernest	Dr.	<a href="mailto:eschrader@columbiaenergyllc.com">eschrader@columbiaenergyllc.com</a>		
USA	SHANNON	Del		<a href="mailto:Del.shannon@barnard-inc.com">Del.shannon@barnard-inc.com</a>		
Japan	KUNISUE	Fumitake		<a href="mailto:fumitake_kunisue@water.go.jp">fumitake_kunisue@water.go.jp</a>		
Japan	SAKAZUME	Shunsuke		<a href="mailto:Sakazume.shunsuke@obayashi.co.jp">Sakazume.shunsuke@obayashi.co.jp</a>		
Japan	TERAMOTO	Junichi		<a href="mailto:j-teramoto@kajima.com">j-teramoto@kajima.com</a>		
Japan	KAMBE	Takayuki		<a href="mailto:tkambe@kajima.com">tkambe@kajima.com</a>		
Canada	CAMPBELL	Ian		<a href="mailto:ianjcampbell@nbpower.com">ianjcampbell@nbpower.com</a>		
Canada	ADEGHE	Louis	Dr.	<a href="mailto:Louis.adeghe@opg.com">Louis.adeghe@opg.com</a>		
Canada	PROTULIPAC	Darren		<a href="mailto:Darren.protulipac@dproassociates.com">Darren.protulipac@dproassociates.com</a>		
UK	BUSH	Adam		<a href="mailto:Adam.bush@dwrcymru.com">Adam.bush@dwrcymru.com</a>		
South Africa	GREYLING	Robert		<a href="mailto:Rgreyling2@knightpiesold.com">Rgreyling2@knightpiesold.com</a>		
South Africa	GELDENHUYS	Lourie		<a href="mailto:lgeldenhuys@knightpiesold.com">lgeldenhuys@knightpiesold.com</a>		
Sweden	TORNBERG	Robert		<a href="mailto:Robert.tornberg@sweco.se">Robert.tornberg@sweco.se</a>		
Malaysia	TAY	Guan Heng		<a href="mailto:Guanheng.tay@sarawakenergy.com">Guanheng.tay@sarawakenergy.com</a>		
China	SUN	Hong Liang		<a href="mailto:Sun-hli@ecidi.com">Sun-hli@ecidi.com</a>		
China	YE	Jianqun		<a href="mailto:Ye-jq@ecidi.com">Ye-jq@ecidi.com</a>		

**ICOLD COMMITTEE ON CONCRETE DAMS**  
**NOTES of MEETING**  
**ICOLD 2019 Ottawa, Canada**

**WORKING SESSION: 08.30 – 12.00 & 13.30 – 16.00 Tuesday, 11-June-2019**  
**(Shaw Center, Room S-208)**

**A. MORNING SESSION (08:30 TO 12:00)**

**1 Membership, Terms of Reference, General Information (Conrad / Shaw)**

- a. Meeting attendance was taken by Conrad. Update on committee membership changes and information that each member needs to do housekeeping of personal data (roster update) individually on ICOLD webpage.
- b. Recollected of the current ToR. Ambitious plan for three new bulletins and work in progress for completion of Expansion Phenomena in Concrete Dams (refer to detailed items below).
- c. Information from Technical Committee Chairmen Meeting (Sunday 9-June-2019):
  - Guidelines for Technical Committees: Conrad will circulate those to committee members for possible comments until mid July-2019. Comments will be forwarded to ICOLD Board for revision of the current document.
  - Bulletins: The ICOLD Board will clarify the situation with respect to the copyright of photos, figures, etc. used in bulletins (currently, the copyright of material published in the bulletins would be with ICOLD). The use of the publisher's bulletin template is mandatory. The Technical Committees report the existing issues with the template to Central Office to be addressed with the publisher. ICOLD Board will clarify to the Technical Committees the process of bulletin submission and publication.
  - ICOLD publications on ICOLD's webpage: Bulletins published from 2018 are accessible from the ICOLD webpage via an external link to the publisher's web-interface. This requires login-credentials, same User as for ICOLD webpage, but separate new Password (still to be provided by the publisher). Members can still download bulletins for free. Pre-print bulletins are still on ICOLD's webpage.
  - Status of completed TC-D Bulletins: B145 in print with edition 2019, B165 in progress of translation by French Committee, B177 in publication process with edition 2020.
- d. Presentation by President Rogers of President's Question on Concrete Dams for the ICOLD Congress 2021. The Question will be voted for at the Ottawa General Assembly (majority vote).

**2 Bulletin Roller Compacted Concrete Dams (Shaw)**

***STATUS:***

The Committee agreed at ICOLD 2013 (Seattle) that an update of the RCC Bulletin should be prepared. The lead author of the Bulletin was Q.H.W. Shaw (South Africa). The drafting sub-Committee comprised the following primary authors: R. Ibañez-de-Aldecoa (Spain/USA), T. Dolen (USA), C. Du (Germany), F. Ortega (Spain/Germany), M.F. Rogers (USA), Q.H.W. Shaw (South Africa) and Y. Xu (China). The Final Draft was submitted to the General

Assembly at the 2018 Vienna Meeting, where it was approved. The French translation was led by Francois Couturier (Canada), allowing the full formal submission to ICOLD Central Office as Bulletin N° 177 in January 2019. The Bulletin is available as Bulletin Preprint on the ICOLD Website and awaits printing; publication is expected for 2020.

This item of the ToR was concluded with a Workshop on Monday 10<sup>th</sup> June 2019 from 08:30am (half day). The workshop was well attended by 70 people. Presenters were Malcolm Dunstan (World Trends in RCC Dams), Quentin Shaw (Bulletin Introduction & Design of RCC Dams; RCC Dam Performance (substitute for Timothy Dolen); RCC Arch Dams); Francisco Ortega (Materials & Selection of RCC Mixture Proportions), Rafael Ibanez de Aldecoa (RCC Dam Construction), Marco Conrad (Quality Control), Mike Rogers (Other Uses for RCC in Dam Construction), Ernest Schrader (The Long-Term Performance of RCC Projects with Challenging Conditions). The workshop closed with a discussion.

***ACTIONS:***

This item of the ToR is closed.

### **3 Expansion Phenomena in Concrete Dams (Charlwood, Berra & Amberg)**

***STATUS:***

The Bulletin was initiated in 2012 under the auspices of the ICOLD Committee for Concrete Dams and the Chairmanship of Dr. Robin Charlwood (USA) who continued in that role until 2015. Dr. Charlwood (USA) and Dr. Berra (ITALY) provided an update of the work at the 2018 Vienna Meeting. They proposed that the bulletin should be split into three:

1. Managing Expanding Concrete Bulletin
2. Prevention of Expanding Concrete Bulletin
3. Case Histories of Expanding Concrete Bulletin

This was accepted by the committee without objection. Parts 2. and 3. are planned to be completed within the current ToR period to 2021.

The Final Draft under the title Bulletin N° 184 - MANAGEMENT OF EXPANSIVE CHEMICAL REACTIONS IN CONCRETE DAMS & HYDROELECTRIC PROJECT has been submitted to ICOLD Central Office in March 2019 for approval at the 2019 ICOLD General Assembly (circulation to National Committees with Circular Letter CL1950).

Part 2 - PREVENTION OF EXPANDING CONCRETE is work in progress. The situation of still ongoing and inconclusive research in this field and particularly related to mass concrete for dams complicates this work.

***DISCUSSION:***

Comments from the formal review by Committee O have been received, Committee O gives a favorable opinion on the draft bulletin. SPANCOLD sent a list of comments prior to the meeting, and during this agreed to proceed with the approval process; the comments will be evaluated by the drafting team before the final drafting. Comments by the French National Committee were discussed at the meeting and these will be taken into account by the drafting team.

***ACTIONS:***

At the meeting the Committee members proposed that the approval process for Bulletin N° 184 should proceed with the commitment by the Technical Committee to incorporate comments received prior to final submission. Work on Parts 2. and 3 will proceed (**Charlwood/Berra/Amberg**)

#### 4 Sustainable Concrete Dam Construction (Conrad)

##### ***STATUS:***

It was agreed at the ICOLD 2009 meeting in Brasilia that our Technical Committee D should develop a Technical Paper considering low cement concrete, optimization of design, minimal energy consumption for possible publication in Intl J. Hydropower and Dams. **Mr. Jabarooti** (former representative IRAN) prepared an updated draft for discussion. It was agreed that the paper should review the general issues involved in sustainable construction of concrete dams, identify metrics to allow quantification and if possible include a section on carbon emissions as an example. Jabarooti made a presentation at the Waterpower and CHINCOLD conference 2013 in Kunming, China. It was discussed at the 2017 Prague Meeting that that focus should be moved to the discussion of carbon footprint of concrete dams. No further progress has been made on this item so far.

##### ***DISCUSSION:***

Conrad briefly discussed the topic and inputs from the members were received. It was concluded that this topic needs a champion outside the drafting teams for the new bulletins. The members agreed that this item will be dropped from the ToR in case no champion was identified by the 2020 Delhi Meeting (Conrad).

#### 5 Discussion on possible Databases (Conrad / Shaw)

##### 5.1 General Discussion

##### ***STATUS:***

The discussions and considerations for ICOLD Databases included the following at past meetings:

- a. Ongoing and long-term objective of assembling and building a database on concrete dams, capturing information for all of the existing (and new) concrete dams and kept building every year
- b. Identification of concrete dams related databases already existing in the public or engineering domain and collection of links
- c. Advancing of discussion on long-term hosting and maintaining databases initiated and developed by the Committee

The topic has not advanced.

##### ***DISCUSSION & ACTION:***

The database on Expanding Concrete Dams will be used as a test-balloon for hosting the database on a Central Office server for internal access by the Committee only. The Central Office will need a specific ToR for that.

It was agreed that the detailed items “Proposed Database on Physical Properties of Concrete Dams (Filho)” and “Database on Expanding Concrete Dams (Charlwood, Amberg)” (Agenda items 5.2 and 5.3) will be dropped from the ToR.

The Committee proceeds with identification and collection of links to concrete dams related databases already existing in the public or engineering domain. Members were asked to send according information to Conrad.

## B. AFTERNOON SESSION (13:30 TO 16:00)

### 6 NEW Bulletin on Modern Methods and Criteria for Arch Dam Design and Analysis (Shaw / Salamon)

#### ***STATUS:***

Dr. Shaw (South Africa) presented an outline at the 2018 Vienna Meeting. It was agreed that, to make this a modern Bulletin, the Bulletin will be a cooperation between Committees D and A. The lead authors will be Dr. Quentin Shaw (South Africa) and Dr. Jerzy Salamon (USA). It is foreseen to submit the Final Draft to Central Office in 2021.

The Committee held a Kick-off Workshop at the Ottawa Meeting on Monday 10<sup>th</sup> June 2019 in an afternoon session (half day), led by Shaw and Salamon. The workshop was well received by 60 attendees. Topics were presented by Committee Members and others.

The drafting team was formed and will include Jerzy Salamon (USA), Quentin Shaw (South Africa), Carlos Granell Ninot (Spain), Bettin Wittke-Schmitt (Germany), Dan Curtis (USA), Guido Mazza (TC-A, Italy), Gerald Zenz (TC-A, Austria), Xavier Molin (TC-A, France), Pierre Labbe.

#### ***DISCUSSION:***

Shaw discussed that the first bulletin in a series of bulletins should have a narrow focus on the design analyses and design criteria to arrive at necessary design decisions, providing a framework.

### 7 NEW Bulletin on Considerations for Ageing Concrete Dams (Nordström)

#### ***STATUS:***

The Committee agreed to prepare this Bulletin through the period of the ToR until 2021. This bulletin could include the following topics:

- Physical Properties of Ageing Concrete
- Guidelines for Inspection of Aging Concrete Dams
- Expectations for Aging of Concrete Dams
- A Framework for Estimating Remaining Life of Aging Concrete Dams

With regard to the performance and inspection of concrete dams, collaboration with the Dam Surveillance Committee should be envisaged.

The lead author will be Dr. Erik Nordström (Sweden). Volunteers were accepted for participation on the Bulletin drafting team, including Committee members and new Co-opted members. Country representation in the drafting team is from Brazil, Canada, Italy, Norway, Spain, Sweden, Switzerland, USA.

#### ***DISCUSSION & ACTION:***

Nordström gave a presentation of a draft table of contents and content frame of individual chapters. The work could include cooperation with Technical Committees A and Q. The scope and draft table of contents is comprehensive and it was discussed to split the scope into a series of bulletins, with the topics of Analyses and Service Life Model, as well as Repair, covered in separate bulletins. Focus should be on concrete dam body and concrete appurtenant structures. The bulletin scope and outline will be updated to also meet volume limitations and drafting assignments distributed (**Nordström**).

## 8 NEW Bulletin on Raising of Concrete Dams (Hughes)

### *DISCUSSION:*

Aled Hughes gave an update on the status of the USSD White Paper on the topic, which currently is under preparation. The draft of the USSD White Paper is targeted for 2019 and is structured as follows:

- Drivers for Dam Raise
- Design Considerations
- Dam Raising Concepts
- Material Properties
- Structural Analyses
- Dam Raise Features
- Monitoring and Performance
- Case Histories

The USSD White Paper will be the starting point for this Bulletin. The Committee agreed to postpone kick-off of this Bulletin until the 2020 Delhi Meeting. Hughes accepted to lead the drafting of this bulletin.

## 9 AOB (Conrad / Shaw)

### 9.1 International SPANCOLD-CHINCOLD Symposium on Roller Compacted Concrete Dams (Conrad)

#### *DISCUSSION:*

The Intl. RCC Symposium is a cooperation between SPANCOLD and CHINCOLD. Due to the fact that no current RCC dam construction projects are ongoing in Spain, the organization for the 2019 event has been handed over to CHINCOLD (Kunming, 11<sup>th</sup> to 12<sup>th</sup> November 2019). The event will take place simultaneously with the CHINCOLD Annual Meeting. A study tour to four completed RCC dams in operation was foreseen. Following up on the Intl. RCC Symposium in Chengdu / China in 2015, which several Committee members attended, the Committee raised the following reservations regarding the attractiveness and value of the upcoming symposium: (1) Essentially no inputs and technical sharing from Chinese attendance, whereas China still constructs the most RCC dams, (2) No study tour to RCC dams under construction.

Past-President Dr. Jia attended the Committee Meeting and heard the Committee's reservations. The organizers of the upcoming event will make all efforts to include the exchange between Chinese and international experts. Technical tours will be re-arranged to meet the interests of experts as far as possible (identification of RCC dams under construction). The organization of the event will be improved to increase its attractiveness for participation.

This was followed by a general discussion in the Committee about the modus of the symposium considering its rejuvenation in the context of the slower rate of developments in the RCC technology. The Committee will compile some proposals to be communicated to SPANCOLD & CHINCOLD.

**Progress Report: Embankment Dam Committee****Meeting Date: 11 June 2019****Attendance list**

<b>COUNTRIES</b>	<b>MEMBERS</b>			<b>Present</b>	<b>Substitutes</b>
Canada	Tournier	Jean-Pierre	Chairman	Yes	
South Africa	Badenhorst	Danie	Vice-Chair	Yes	
Australia	Hunter	Gavin	Member	Yes	
Austria	Landstorfer	Lorain	Member	Yes	
Brazil	Viotti	Cassio B,	Member	Yes	
Bulgaria	Dimitrov	N.I	Member	No	
China	Nenghui	L.	Member	No	Need confirmation
Colombia	Marulanda	Alberto	Member	Yes	
Czech Republic	Svejkovsky	Jan	Member	No	
Egypt	Hassen	Mohammed	Member	No	Did not get Visa
Finland	Laasonen	Juha	Member	Yes	
France	Fry	Jean-Jacques	Member	Yes	Mallet Thibault Co-opt member
Germany	Limbach	Markus	Member	Yes	
Greece	Dounias	George	Member	Yes	
India	Kapoor	V.K.	Member	No	
Indonesia	Djarwadi	Didiek	Member	No	
Iran	Tarkesh Dooz	Nasser	Member	Yes	
Italy	Federico	Francesco	Member	No	
Japan	Tagashira	Hidekazu	Member	Yes	
Korea	Kim	Kyoung-wook	Member	No	
Nederland	Andre	Koelewijn	Member	Yes	
Norway	Afsari-Rad	Vahid	Member	Yes	
Portugal	Maraha Das	E	Member	No	
Russia	Buryokov	Oleg	Member	No	
Slovakia	Miscik	Marian	Member	Yes	
Spain	Soriano	Antonio	Member	No	Passed away
Sri Lanka	Sooriyabandara	L.	Member	Yes	
Sweden	Ekstrom	Ingvar	Member	yes	
Switzerland	Favero	Valentina	Member	yes	

Thailand	Smaroon	A	Member	No	
Turkey	Askerogly	Mehmet	Member	Yes	Mehmet H Askerogly (Co-opt)
United Kingdom	Bridle	Rodney C.	Member	Yes	
United States	Paul	David	Member	Yes	
Venezuela	Martinez	Gabriel	Member	No	

**Observers: 240 observers attended.**

#### **Distribution list of emails**

##### **Official representatives (including new members):**

mhaskeroglu@bar-su.com; brenner.gde@sunrise.ch; rodney.bridle@damsafety.co.uk; David.Kleiner@stantec.com; netzod@gmail.com; didiek.djarwadi@pamapersada.com; gdounias@edafos.gr; Ingvar.Ekstrom@sweco.se; jean-jacques.fry@edf.fr; thori@affrc.go.jp; Hunter, Gavan <gavan.hunter@aecom.com>; IsichenkoBN@lhp.ru; Roman.Ivanco@svp.sk; rjappel@tin.it; bkamaladasa@gmail.com; Kapoorvekay@yahoo.com.in; juha.laasonen@fortum.com; nhli@nhri.cn; markus.limbach@strabag.com; thibaut.mallet@symadrem.fr; emn@civil.ist.utl.pt; mmalley@golder.com.au; gamartinezp@gmail.com; amarulapos@ingetec.com.co; susumu@affrc.go.jp; sophie.messerklinger@gmx.at; marian.miscik@svp.sk; jknoh@cnu.ac.kr; occsusa@hotmail.com; david.b.paul@usace.army.mil; npelen@dsi.gov.tr; Peloquin.Eric@hydro.qc.ca; radchenkovg@vniig.ru; tibgnimi@yahoo.fr; lssooriyabandara@gmail.com; antonio.soriano@ingesuelo.com; apichat\_s@team.co.th; tagataga@affrc.go.jp; NTarkeshDooz@yahoo.com; peter.tschernutter@kw.tuwien.ac.at; vahid.afsari-rad@veidekke.no; cbviotti@hotmail.com; wangweibiao59@hotmail.com

----- WORKSHOP HELD

#### **Workshop BY THE COMMITTEE E**

Committee E held a Workshop on June 10, 2019, with more than 40 total attendees. The new bulletins were discussed.

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#### **AGENDA OF THE TECHNICAL COMMITTEE E**

The agenda of the meeting held on 11 June 2019 was as follows:

##### **1. Opening remarks by the Chairman:**

- ✓ Members and substitutes (New members)
- ✓ Workshops

- ✓ Technical Committees Chairmen meeting with ICOLD Officers
- ✓ ICOLD website: Member section: New member password for after 2018 bulletins. There are two passwords now. Template available on website. Share space for the Committee on the website
- ✓ ICOLD 2021 Questions for Congress in France
- ✓ Comments on Dam Type Selection draft bulletin
- ✓ Guidelines for Bulletins for Technical Committee Meetings

## **2. Approval of minutes of the previous meeting held in Vienna, 2018.**

## **3. Additions to the agenda of the day.**

## **4. Working group on tropical soils foundations treatment for embankment dams.**

- Status update – need champion.

## **5. Internal Erosion of Existing Dams, Dikes and Levees, and their Foundations**

## **6. Asphaltic Core Dams**

- Bulletin approved/translated?

## **7. Geotextiles in Dams**

- Status progress (D. Badenhorst)

## **8. Proposal of new bulletins:**

9.1 Filters-Drains, Transition and Slope Protection

9.2 Update of the proposal from the Spanish Committee (A. Soriano).

9.3 Cofferdams (D. Paul)

9.4 Materials for cut-offs (D. Paul)

9.5 Deformation and cracking in embankment dams (G. Hunter, G. Dounias and Cassio Viotti)

9.6 Updating of the CFRD bulletin

9.7 Compaction of earthfill in embankment dams (JJ Fry)

9.8 Other

## **9. Contributions from the floor**

9.1 Progress on the Mosul Dam Foundation rehabilitation (Georgette Hlepas)

9.2 Presentation on first ACRD in the USA – Markus Limbach

9.3 Announcement of European Club Symposium in October – George

9.4 Internal erosion - George

## **10. Co-ordination of other technical meetings**

- Committee on Soil cemented dams
- Committee on Levies

## **11. Other**

### **MINUTES OF THE MEETING IN SHAW CENTER ON 11 JUNE 2019**

#### **1. General**

The general comments of the chairperson were discussed and the new representatives of countries were welcomed and given an opportunity to introduce themselves.

Notice was taken and Condolences were discussed regarding the following members who passed away: Helga Sexagaardt, Peter Bruno, Antonio Soriano and Guy Larocque.

This committee is working on 7 new bulletins.

Share space and the passwords for existing and new bulletins on the ICOLD website were discussed during the meeting.

Committee members were invited to make comments on the dam type selection draft bulletin as well as the cemented soil dams bulletin.

## **2. Proposed New Bulletin on Tropical Soils**

No progress had yet been made on the proposed bulletin on foundations in tropical residual soils. The chairperson will discuss the initiation of the new bulletin with Dr Chraibi who is willing to take the lead on the update of this bulletin as part of the embankment dam committee.

## **3. New Bulletin on Geotextiles in Dams**

It was agreed that a team consisting of Peter Pyke, Jean-Jacques Fry as well as David Paul will finalise this bulletin. Jean-Jacques will have spare time after September this year to contribute and to assist with translation into French.

## **4. Internal Erosion Bulletin**

On going discussion on this new bulletin is taking place and Rodney Bridle announced several aspects.

## **5. New Bulletin on Cofferdams**

Dave Paul (USA) presented on a new Bulletin on Cofferdams. A Table of Contents and a working group will now be established Contributions from the floor was proposed. The meeting suggested that various types of cofferdams be included e.g. rockfill protected by geotextile and shotcrete, jet-grouting walls in gravel dams etc.

## **6. New Update on ICOLD Bulletin 51 of 1985 on Cut –off walls**

An update including table of contents on ICOLD Bulletin 51 of 1985 on Cutoff Walls was discussed. A draft of this bulletin will be prepared by the end of the year for contributions by the member countries.

## **7. New Bulletin on deformations and cracks in Earthfill Embankment dams**

Gavan Hunter (Australia) made a presentation on the outline of a bulletin on deformation and cracking in embankment dams. The objective is to provide more specific data on crack locations, widths and depths for examining whether concentrated leak erosion could occur, particularly through transverse cracks in the crests of dams. The Committee agreed to proceed; the new bulletin would add to the ICOLD guidance in Bulletin 164 on internal erosion in dams and levees.

Cassio Viotti made a presentation on the design considerations regarding zoning of the dam with various types of materials to prevent cracking and based his presentation on Emborcacao Dam analysed in Brasilia.

George Dounias made a presentation on the failure of homogeneous dams by internal erosion – The case of Sparmos Dam, Greece.

The meeting proposed that the bulletin should include the best practices also to prevent excessive deformations and cracking. Gavin Hunter will update his draft bulletin for comments by the member countries.

#### **8. Proposed new Bulletin on Compaction**

Jean-Jacques Fry made proposals interesting aspects to be included in a new bulletin regarding compaction. The meeting suggested that it must be considered to provide a bulletin on compaction of the earthfill only and that a bulletin on sand and rockfill compaction is carried out in a separate bulletin.

#### **9. Proposed new Bulletin on Filters, Drains and Transitions and Slope Protection**

Dr Soriano (Spain) passed away. There is no champion for this bulletin anymore.

#### **10. Update of the CFRD bulletin**

It was decided that Alberto Marulanda will lead the update of the CFRD by including the new developments regarding the compression failure of vertical joints in the upstream face slab. He will be assisted by Jean-Jacques Fry which has different information available and also with regard to. Mr Wang will provide the contact for the inclusion of the Chinese information in this regard.

#### **11. Presentation on the Mosul Dam Spillway failure incident**

Georgette Hlepas (US Army of Engineers) reported on the situation on the rehabilitation at Mosul Dam in Iraq. US Army of Engineers was on site for the past years, supervising the Italian Trevi (company) grouting and remediation contract to limit solution of the gypsum in the foundation which had

proceeded well. New grout curtains had been grouted, gate repairs and other improvements had been completed and the Iraqi grouters trained in the use of new equipment. This contract is ending now and ongoing grouting by the Client will take place from now on.

## **12. Presentation on an ACRD in America**

Markus made a presentation on the first asphalt concrete rockfill dam in America done by Strabag.

## **13. Closure**

The meeting was closed by 14h30.

F) ENGINEERING ACTIVITIES ASSOCIATED WITH THE PLANNING PROCESS FOR WATER RESOURCES PROJECTS				F) ACTIVITÉS D'INGÉNIERIE DANS LE PROCESSUS DE PLANIFICATION DES PROJETS DE RESSOURCES EN EAU	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in Ottawa, 11 June 2019				Réunion à Ottawa, 11 juin 2019	
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
.Canada	BIBEAU	Johanne	Co-Chair	P	
.Australia	HERWEYNEN	Richard	Member	P	
Brazil			Member		
France			Member		
Germany			Member		
Japan	KAWASAKI	Hideaki	Member	P	
Russia	KHAZIAKHMETOV	Rasim	Member		A
South Africa	MABUDA	S.	Member		A
Spain	BURGUENO MUNOZ	Antonio	Member		A
United Kingdom			Member		
United States			Member		
Korea	KIM	Kyoung-wook	Member		A
Iran	BOZORGZADEH	E.	Member		A
OBSERVERS : Mike Noseworthy (Canada)					

### Terms of Reference:

The following was the extended term of reference agreed in Lucerne in 2011:

1. More detail for each of the 8 steps in the planning process proposed in our position paper.
2. Prepare a discussion paper on the issue of “benefits” – what are the types of benefits that should be considered when evaluating a project?
3. Prepare a discussion paper in the multi-criteria assessment – what are the criteria a project should be assessed against and how should the project be assessed against these criteria?
4. Prepare a discussion paper in the “Management of Engineering Activities during Implementation”. This should include all phases – investigation, preliminary design, detailed design and construction. What is the best practice in regards to this?

### Introduction:

The committee met from 09:00am – 16:00 in the Westin Hotel in Room Cedar in Ottawa, Canada on Tuesday, 11 June 2019. This was the seventh meeting since the new terms of reference were approved at the Lucerne meeting in 2011 (no meeting was held in 2018). A total of 3 committee members were present, along with one observer. The meeting was held by the Co-Chair, Johanne Bibeau, while the new Chair, Arbi Hama Ould Sidi Mohamed was not able to attend.

### Agenda:

1. Welcome: welcome remarks started at 9:00am
2. Discussion of new Chair and co-Chair
3. Progress – and particular difficulties to have a significant number of members participating to the works
4. Key points out of the Chairperson’s Committee Meeting
5. Opportunities for Members to share any new developments from their countries on the **Planning Process of Water Resource Projects**, and in particular around the Engineering Activities and refresh on our discussions in Prague
6. Opportunities for Members to Present **Examples of How Multi-Criteria Assessment** (eg. Engineering, Environment, Social, Financial and Other) has been used on evaluating water resource projects within their country
7. Any other information that people would like to share
8. Meeting was closed at 16:00pm

### Agenda Item 2 - Discussion on Discussion of new Chair and Co-Chair

A formal acceptance of the new Chairperson has been asked by Mr. Arbi to the ICOLD Secretariat, and this item should be part of the ICOLD 2019 Board Meeting Agenda. Mr. Arbi asked Mrs Johanne Bibeau to act as Co-Chair.

### Agenda Item 3 - Discussion on Progress:

Very little progress has been achieved since 2017 in Prague. The main reasons for this were due to difficulties to have a significant number of members participating to the annual meeting and works during the year, lack of time of the participants, lack of a clear collective understanding of what we are trying to achieve, and possibly program too ambitious considering the limited regular participants. There is still discussion on alignment with the committee's scope of "Engineering Activities" associated with the planning process of water resource projects. The going forward orientation was to be directed by the new Chair of the committee, Mr Arbi, but he could not attend. Nevertheless, a discussion took place, and the result of this is presented hereafter and will be shared with the Chair.

### Agenda Item 4 - Key points out of the Chairperson's Committee Meeting

There was no participation to the Chair's Committee Meeting which took place on June 9.

### Agenda Item 5 - New Developments in Representatives Countries and refresh on our discussions in Prague:

Richard Herweynen (Australia) discussed how important is the discussion about storage as coal energy to be gradually replaced by more renewable energy within Australia. There is a greater interest in Australia in hydro pump storage and/or better utilization of existing hydropower storages.

### Agenda Item 6 – Examples of How Multi-Criteria Assessment has been used:

Richard Herweynen (Australia) has shared one document in 2018 referring to multidimensional stress for hydropower. No specific additional examples of projects analysed and/or constructed using multi-criteria assessment has been presented.

It seems important to all participants that a discussion with other ICOLD Technical Committees such as the Committee on the Environment (G) could take place since this committee could have discussed and compiled some examples of projects similar to those our committee are trying to cumulate as case studies.

### Agenda Item 7 – New Terms of Reference discussed:

The focus of the meeting was more oriented on the strategy to allow a progress on the committee subject "ENGINEERING ACTIVITIES ASSOCIATED WITH THE PLANNING PROCESS FOR WATER RESOURCES PROJECTS".

The members present at the meeting returned to the Terms of reference of 2011, discussed again the works achieved during the last years and concluded that the Terms of Reference should be revisited. The Appendix presents the proposed action to ICOLD General Secretary

Close of Meeting: Meeting finished at 16:00pm and report was prepared by the Co-Chair who acted as the Chairperson

## **APPENDIX**

### **A. Need for Committee F additional members (for Terms 2019-2022)**

1. Addition of a minimum of 4 members from different countries preferably
2. Current representation is from Mali (Chair), Canada (Co-Chair), Australia, Japan
3. New members should be committed and provide appropriate experiences on application of multi-criteria approach

### **B. Guidance on Terms of reference for Bulletin proposed :**

1. Introduction : importance of assessing projects using a multi-criteria approach
2. It is important that an options assessment process is undertaken in the early stages of a water resource project, and the various options are assessed using some sort of multi-criteria assessment (IHA, WCD)
3. 2. Present the 9 steps process (proposed in our position paper produced in Nov 2009 by Committee F).
4. 3. What are the multi-criteria? (equivalent to Step 2)
5. This chapter will present the criteria to be considered in view of variants comparison
6. 4. Different approaches of applying multi-criteria assessment (qualitative, quantitative, with the stakeholders participation since the beginning)
7. 5. Some case studies showing different approaches of multi-criteria assessment (discussion and comparison with Committee G- Environment to see if they have similar approach)

**G) COMMITTEE ON THE ENVIRONMENT**

## PROGRESS REPORT

Meeting in Ottawa, June 11th, 2019

**G) COMITÉ DE L'ENVIRONNEMENT**

## RAPPORT D'ACTIVITÉ

Réunion à Ottawa, 11 juin 2019

MEMBERSHIP / LISTE DES MEMBRES			MEETING / REUNION	
COUNTRIES / PAYS	MEMBERS / MEMBRES		Present	Absent / Substitutes
France	PIGEON	Jean-Luc (President)	P	
Australia	FOX	Steven		A
Brazil	COIMBRA	Antonio		A
Canada	VANIER	Benoit		A
Germany	DETERING	Michael		A
India	DAMODHAR ANNAPPA	Thota	P	
Iran	GHARAVY	Mojtaba		A
Japan	YASUDA	Goro	P	
	FUKUDA	Yuta (co-opted)	(P)	
Korea	SE-WONG	Chung		A
New Zealand	AMOS	Peter	P	
Pakistan	MALIK	Khalid		A
Panama	MUSCHETT	Daniel	P	
Russia	CHERNYSHENCO	V. Pavel (new member)		A
Slovakia	LIPTAK	Branislav	P	
Slovenia	SMOLAR-ZVANUT	Natasa (Ms)	P	
Sweden	LÖFQVIST	Magnus	P	
United Kingdom	WILLIAMSON	Tracey (Ms) (Vice-President)		A
United States of America	DWYER	Blaine	P	
<b>OBSERVERS</b> // UK : MITCHELL Chrissy // Japan : USUGI Tomonori // Mozambique : CUAMBE Nercia // Canada : VADEBONCOEUR Christine // Costa Rica : HERNANDEZ Milena // Columbia : AMAYA Andres // Nigeria : OKELEKE Jane				

<p>ICOLD COMMITTEE ON THE ENVIRONMENT Progress Report Meeting in Ottawa, June 11st, 2019</p> <p>In 2017, the term of office of the Committee on the Environment (“the Committee”) was proposed to be extended for three years (2017 - 2020). It would terminate in 2020. The Committee has nineteen country-members. Nine members are present at the Ottawa meeting plus one co-opted member.</p> <p>The Committee received copy of requests (email) sent to the ICOLD Secretariat to appoint M. LÖFQVIST Magnus (Sweden) and M. YASUDA Goro (Japan) as new representatives to the ICOLD Committee on Environment.</p> <p>In addition, we understand that participants as observers of the National Committees of Nigeria (Jane OKELEKE), Colombia (Andres AMAYA) and Mozambique (Nercia CUAMBE) are actively pursuing nominations for committee membership through their National Committees and ICOLD. Their input to developing case studies for the Environment Committee and those from observers Chrissy MITCHELL (United Kingdom), Christine VADEBONCOEUR and others is gratefully acknowledged.</p> <p><b>1. INTRODUCTION AND WORKING PROGRAMME OF THE COMMITTEE</b></p> <p>President introduces the technical meeting programme as follows:</p> <ol style="list-style-type: none"> <li>Welcome and presentation of members – update of list of members for Committee G</li> <li>Brief outcome of the workshop which was held in Ottawa on Monday June 10 (Nine informative presentations were made by Committee Members)</li> <li>Update of abstracts and case studies list and associated documentation (as part of the ToR of the Committee)</li> <li>Review and approval of case studies by the Committee. Objective of the process is a full and common understanding of our ToR and the different ways they can be fulfilled.</li> <li>Miscellaneous</li> </ol> <p><b>2. STATUS OF THE MANDATE</b></p> <p><u>Recall of mandate:</u></p>	<p>CIGB COMITE DE L'ENVIRONNEMENT Rapport d'activité Réunion d'Ottawa, 11 juin 2019</p> <p>En 2017, le terme du Comité de l'environnement (ci-après « le Comité ») a été proposé pour être prolongé de trois ans (2017 - 2020). Il se terminera ainsi en 2020. Le Comité compte dix-neuf pays membres. Neuf membres sont présents à la réunion de Prague ainsi qu'un membre coopté.</p> <p>Le Comité a reçu copie d'emails envoyés au secrétariat général de la CIGB demandant la nomination de M. LÖFQVIST Magnus (Suède) et M. YASUDA Goro (Japon) en tant que représentants au Comité technique de l'environnement.</p> <p>De plus, nous comprenons que les participants des comités nationaux du Nigeria (Jane OKELEKE), de la Colombie (Andres AMAYA) et du Mozambique (Nercia CUAMBE) en tant qu'observateurs font activement acte de candidature pour participer au comité par le biais de leurs Comités nationaux et de la CIGB. Nous les remercions sincèrement pour leur contribution à l'élaboration d'études de cas pour le Comité de l'environnement, ainsi que les observateurs Chrissy MITCHELL (Royaume-Uni), Christine VADEBONCOEUR et d'autres.</p> <p><b>1. INTRODUCTION ET PROGRAMME DE TRAVAIL DU COMITE</b></p> <p>Le Président introduit comme suit le programme de la réunion technique :</p> <ol style="list-style-type: none"> <li>Accueil et présentation des participants – mise à jour de la liste des membres du Comité G</li> <li>Bref résumé des résultats de l'atelier qui s'est tenu à Ottawa le lundi 10 juin (9 présentations ont été effectuées)</li> <li>Mise à jour des résumés et des études de cas, et des documents associés (dans le cadre des TdR du Comité)</li> <li>Revue et approbation des études de cas par le Comité. L'objectif est d'arriver à une compréhension complète et partagée des termes de référence et des différentes manières de les remplir.</li> <li>Divers</li> </ol> <p><b>2. ETAT D'AVANCEMENT DES TERMES DE REFERENCE</b></p> <p><u>Rappel des termes de référence :</u></p>
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<p style="text-align: center;"><b>“Integrating dams with the environment”</b>  <b>Case studies involving planning, construction and operation of dams demonstrating environmental and socio-economic benefits.</b></p> <p><u>Planning and reviewing process of case studies:</u>  The number of cases studies prepared and reviewed is out of the target dates which were decided in Vienna: all case studies should have been presented in the Ottawa meeting. However, excellent progress has been made on many of them and more than half have full drafts and are in, or about to begin, their review processes.</p> <p>It is recommended to urge the preparation of the case studies. Reasons for the delay are about:</p> <ul style="list-style-type: none"> <li>- Some case studies require an approval of the owners of the dams which could not be obtained last year;</li> <li>- Some case studies necessitate further discussions to comply to the ToR, as the main objective is to illustrate the benefits for the environment;</li> <li>- Some changes occurred for the permanent members in charge (new members)</li> </ul> <p>The authors should send their draft paper to the reviewers (with copy to presidents) immediately after the Ottawa meeting (if the paper is ready), or later on when papers are ready.</p> <p>No new target dates were planned for the completion of case studies as they are already outdated, except for new case studies as proposed by new members.</p> <p>The list of case studies figures below with associated details.</p> <p><u>Rules for authors:</u>  Compliance to the ToR should be looked for, and paper reviewed accordingly.</p> <p>It is recommended to follow the general headings as decided by the Committee last year, as follows:</p>	<p style="text-align: center;"><b>« Intégrer les barrages dans leur environnement »</b>  <b>Etudes de cas concernant la conception, la construction et l’exploitation ayant des intérêts environnementaux et socio-économiques</b></p> <p><u>Procédure de revue des études de cas :</u>  Le nombre d'études de cas préparées et examinées est en dehors des dates cibles fixées à Vienne : toutes les études de cas auraient dû être présentées à la réunion d'Ottawa. Pour autant, beaucoup de progrès ont été accomplis pour bon nombre d'entre eux : plus de la moitié ont des textes complets et sont soit en cours de revue, soit sur le point de commencer leur processus de contrôle.</p> <p>Il est recommandé d'accélérer la préparation des études de cas. Les raisons du retard à ce propos sont :</p> <ul style="list-style-type: none"> <li>- Certaines études de cas nécessitent une approbation de publication des propriétaires des barrages, ce qui n'a pas pu être obtenu l'année dernière ;</li> <li>- Certaines études de cas nécessitent des discussions supplémentaires pour se conformer aux termes de référence, l'objectif principal étant d'illustrer les avantages pour l'environnement ;</li> <li>- Quelques changements sont survenus en ce qui concerne les membres permanents en charge (nouveaux membres)</li> </ul> <p>Les auteurs doivent ainsi envoyer leur étude de cas en version provisoire aux deux vérificateurs, immédiatement après la réunion d'Ottawa si les études de cas sont déjà disponibles (avec copie au Président et au Vice-Président) ou plus tard lorsque les études de cas seront prêtes.</p> <p>Aucune nouvelle date cible n'a été prévue pour l'achèvement des études de cas car les dates sont déjà dépassées, à l'exception des nouvelles études de cas proposées par les nouveaux membres.</p> <p>La liste des études de cas figure en annexe.</p> <p><u>Règles pour les auteurs :</u>  La conformité aux termes de référence doit être recherchée et le document examiné en conséquence.</p> <p>Il est recommandé de suivre les rubriques générales décidées par le Comité l'année dernière, comme suit :</p>
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<p><b>1. Summary</b>  <b>2. Scheme description</b>  2.1 Location  2.2 Purpose of the dam  2.3 Main environmental and social baseline features  <b>3. Strategy for achieving the environmental and social objectives</b>  3.1 Environmental and social issues of the project/scheme  3.2 ...  3.3 ...  <b>4. Conclusions and Lessons Learnt</b>  5. References</p> <p>The authors have the possibility to deviate as necessary for the sake of their paper but should try to comply with the above-mentioned headings. Any help or advice can be sought from reviewers and chairman.</p> <p><u>Reminder of the Rules for reviewers:</u>  Guidelines for reviewers have been drafted as follows:</p> <ol style="list-style-type: none"> <li>1 Does the paper fit into the ToR? (ToR compliance)</li> <li>2 Use the template provided by ICOLD</li> <li>3 Use the heading structure as decided by committee (5 main headings)</li> <li>4 Check the language spelling</li> <li>5 Be factual, do not state only your own opinions</li> <li>6 Contents must fit with the main headings which were decided (see templates for case studies)</li> <li>7 Evidences are provided in the paper</li> <li>8 Maps, photographs and graphics should be included in the paper in JPG format of good quality.</li> <li>9 Photographs should be free of rights</li> <li>10 Scales should be graphically designed</li> <li>11 Metric system is in use</li> </ol> <p><u>Draft organization of the bulletin presenting the case studies</u></p> <p>Discussions were held on the introduction of the bulletin before the presentation of the case studies, as guidelines for the readers. Peter AMOS presented a draft for the foreword, executive summary, introduction and some other chapters giving some basics about dams and the environment. Blaine DWYER recalled about the entry</p>	<p><b>1. Résumé</b>  <b>2. Description de l'aménagement</b>  2.1 Localisation  2.2 Objectif du barrage  2.3 Principales caractéristiques environnementales et sociales  <b>3. Stratégie pour atteindre les objectifs environnementaux et sociaux</b>  3.1 Enjeux environnementaux et sociaux du projet / de l'aménagement  3.2 ...  3.3 ...  <b>4. Conclusions et leçons à tirer</b>  5. Références</p> <p>Les auteurs ont la possibilité de s'écarter au besoin pour l'intérêt de leur travail mais doivent s'efforcer de se conformer aux rubriques indiquées ci-dessus. Toute aide ou conseil peut être sollicité auprès des vérificateurs et du président.</p> <p><u>Règles pour les contrôleurs :</u>  Des règles à suivre pour les contrôleurs/vérificateurs ont été décidées comme suit :</p> <ol style="list-style-type: none"> <li>1. L'étude de cas s'inscrit-elle dans les TdR ? (Conformité aux TDR)</li> <li>2 Utiliser le modèle fourni par la CIGB</li> <li>3 Utiliser la structure de titre telle que décidée par le comité (5 rubriques principales)</li> <li>4 Vérifier l'orthographe de la langue</li> <li>5 Etre factuel, ne pas donner seulement vos propres opinions</li> <li>6 Le contenu doit correspondre au contenu des principales rubriques qui ont été décidées (voir les modèles pour les études de cas)</li> <li>7 Les données fournies dans le document sont prouvées autant que possible</li> <li>8 Les cartes, photographies et graphiques doivent être inclus dans le document au format JPG de bonne qualité.</li> <li>9 Les photographies doivent être libres de droits</li> <li>10 Les échelles graphiques doivent être utilisées</li> <li>11 Le système métrique est utilisé</li> </ol> <p><u>Projet d'organisation du bulletin présentant les études de cas</u></p> <p>Des discussions ont eu lieu sur l'introduction du bulletin avant la présentation des études de cas, à titre de directives pour les lecteurs. Peter AMOS a présenté un projet de préface, un résumé, une introduction et quelques autres chapitres contenant des notions de base sur les barrages et l'environnement. Blaine DWYER a rappelé l'existence du tableau de saisie (la matrice des études de cas) indiquant le</p>
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<p>table (the case study matrix) showing the type, purpose, phase, challenges, solutions, benefits and lessons learnt (uploaded in the share space in the Ottawa folder). It was decided to include all basic information about dams and the environment in only one chapter, located after the introduction, and called “overview about dams and the environment” (draft title). Peter AMOS, with the help of chairman, vice-chairman and UK observer, is in charge of this topic.</p> <p><u>New case studies:</u> Nigeria, Mozambique and Columbia expressed their wish to propose a case study. The proposal of the Committee was to send first an abstract of the proposed case study in order to be approved by Chairman and Vice-Chairman.</p> <p><b>3. ORGANIZATION OF THE COMMITTEE</b></p> <p>A new vice chairman was elected by the committee: Mr. Blaine DWYER.</p> <p><b>4. LIST OF CASE STUDIES AND STATUS</b></p> <p>List of case studies and associated status is given as appendix of this progress report.</p> <p>Jean-Luc PIGEON June 12<sup>th</sup>, 2019</p>	<p>type, le but, la phase, les défis, les solutions, les avantages et les leçons tirées (téléchargé dans l'espace de partage du dossier Ottawa). Il a été décidé d’inclure toutes les informations de base sur les barrages et l’environnement dans un seul chapitre, situé après l’introduction, intitulé « Vue d’ensemble sur les barrages et l’environnement » (titre provisoire). Peter AMOS, avec l'aide du président, du vice-président et de l'observateur britannique, est responsable de ce sujet.</p> <p><u>Nouvelles études de cas :</u> Le Nigeria, le Mozambique et la Colombie ont exprimé le souhait de proposer une étude de cas. La proposition du comité a été d’envoyer tout d’abord un résumé de l’étude de cas proposée pour approbation par le président et le vice-président.</p> <p><b>3. ORGANISATION DU COMITE</b></p> <p>Le comité a élu un nouveau vice-président : M. Blaine DWYER.</p> <p><b>4. LISTE DES ETUDES DE CAS ET STATUT DE REALISATION</b></p> <p>La liste des études de cas et le statut associé sont fournis en annexe de ce rapport d'avancement.</p> <p>Jean-Luc PIGEON 12 juin 2019</p>
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## ANNEXE : LIST OF CASE STUDIES

n°	Case study name	Presented by	from	abstract	full text	ToR compliance	Reviewer1	Reviewer2
1	Elan Valley Dams	Tracey Williamson	UK	yes	yes	Benefits: illustrate public education, cultural heritage (over 100 years old)	B. Vanier	B. Dwyer
Status: comments from Blaine and Peter (Benoit?) have to be sent to Chrissy for last issue. Paper ready planned by end of July.								
2	Kaleta hydropower plant (Guinea)	Jean-Luc Pigeon	France	yes	yes	Benefits: illustrate resettlement issues and socio-economic benefits for villages	P. Amos	T. Williamson
Status: case study ready. Last issue by Jean-Luc end of July with integration of reviewers ' comments								
3	Matahina power scheme peaking station	Peter Amos	New Zealand	yes	yes		G. Yasuda	JL Pigeon
Status: case study on the web site and sent to reviewers. Review to be done								
4	Miyagase	G. Yasuda	Japan	yes	yes	Benefits to be highlighted?	B. Dwyer	M. LOFQVIST
Status: amended paper to comply to the ToR within July 15 to be sent to reviewers								
5	Nam Theun 2 dam (Laos)	Electricité de France/ Jean-Luc Pigeon	France			Jean-Luc Pigeon to obtain case study from EDF	P. Amos	B. Dwyer
Status: Jean-Luc to try again through French committe of dams - through IFC/WB. Try connection thought UK								
6	Campbell river water use plan	Peter Amos	New Zealand	yes	yes	Integrated system of dams, improving the fish habitat conditions. Status of the text: under preparation.	C. Mitchell	B. Dwyer
Status: Reviewing process to be started. Be sure the paper is sent to reviewers and BC Hydro end of June								

## ANNEXE : LIST OF CASE STUDIES

7	Collaboration on Eels protection	M. LOFQVIST	Sweden	yes	yes	Eels migration. Status of the text: under preparation. <u>Compliance to the TOR to be assessed and discussed</u>	N. Smolar-Zvanut	G. Yasuda
Status: Abstract to be sent asap to chaimans to be confident with ToR compliance. Case study to be re oriented before submission to reviewers by end of July. First review done by G. Yasuda.								
8	Eastmain-1-A and Sarcelle powerhouses and Rupert diversion project	Benoit Vanier	Canada			Adaptation of the existing text to be done, biodiversity focused, main question: monitoring biodiversity issues. Status of the text: under preparation. Writer: Benoît Vanier	N. Smolar-Zvanut	M. LOFQVIST
Status: waiting for Benoit's paper. Chaiman to approach Benoit								
9	Sava river case	Natacha Smolar-Zvanut	Slovenia			lot of mesures for nature; Flood protection.	M. LOFQVIST	Branislav Lipták
Status: Abstract to be sent by end of July to Chairmen								
10	Banska Stiavnica - historic water management system	Branislav Lipták	Slovakia	yes	yes	historical case. Cultural heritage. Ecotourism, flood protection, ...uploaded in February and sent to reviewers	P. Amos	B. Dwyer
Status: Peter to finish the review by the end of July.								
11	Chimney Hollow	Blaine Dwyer	US	yes	yes	Subject and issues: National park, water quality issues	G. Yasuda	JL Pigeon
Status: waiting for approval from owners till the end of August 2019. change for new case study if negative answer								
12	Gross dam (Colorado)	Blaine Dwyer	US	yes	yes	Biodiversity, downstream impacts,..	B. Vanier	Brasilian member
Status: waiting for approval from owners till the end of August 2019. change for new case study if negative answer								

## ANNEXE : LIST OF CASE STUDIES

13	Scotland case	Tracey Williamson	UK			Pump storage hydropower	B. Dwyer	P. Amos
Status: waiting untill Tracey opinion. Chrissy will confirm								
14	Improving biodiversity management	c/o Benoit Vanier	Canada			biodiversity management (salmons). Innovations about pre planning and follow-up. Management systems about biodiversity. Net gain of biodiversity	Jl Pigeon	M. LOFQVIST
Status: waiting for Benoit's paper. Chaiman to approach Benoit								
15	Water quality monitoring within the Cahora bassa reservoir	Edite Sonia Cesar Nhantumbo	Mozambique			water quality monitoring - climate change. How to improve monitoring. Drinking water issue.	B. Vanier	T. Tracey
Status: Mozambique confirmed the production of a case study. Abstract to be sent asap								
16	National Census on River and Dam Environment: underpinning dam upgrades in Japan	G. Yasuda	Japan	yes	yes	mitigation - monitoring - including water quality - downstream	B. Vanier	JL Pigeon
Status: Abstract to be sent asap to Chaimans to be confident with ToR compliance. Amended paper within July 15 to be sent to reviewers								

	<b>H) DAM SAFETY</b>				<b>H) SECURITE DES BARRAGES</b>	
	<b>PROGRESS REPORT</b>				<b>RAPPORT D'ACTIVITÉ</b>	
	Meeting in Ottawa 11 June 2019				Réunion à Ottawa, 1 juillet 2019	
	<b>MEMBERSHIP / LISTE DES MEMBRES</b>				<b>MEETING / Réunion</b>	
	<b>COUNTRIES PAYS</b>	<b>MEMBERS MEMBRES</b>			<b>Present/Absent</b>	<b>Absent/Substitutes</b>
1	Canada	ZIELINSKI	Przemyslaw	Chairman	Present	
2	Netherlands	JANSSEN	J.P.M.F.	Vice-Chair	Present	
3	Switzerland	BALISSAT	Marc	Vice-Chair	Present	
4	Albania	JOVANI	Arjan	Member		Absent
5	Argentina	GIULIANI	Francisco	Member		Absent
6	Australia	McGRATH	Shane	Member	Present	
7	Austria	NETZER	Elmar	Member	Present	
8	Brazil	MEDEIROS	Carlos Henrique	Member		Absent
9	Bulgaria	KISLIAKOV	Dimitar	Member	Present	
10	Chile	PRISCU	Caius	Member	Present	
11	China	XU	Zeping	Member	Present	
12	Czech Rep.	HODAK	Jiri	Member	Present	
13	Egypt	KTOUBAR	Khaled	Member		Ashraf EL-ASHALL
14	Ethiopia	SHIFERAW	Frezer	Member		Absent
15	Finland	ISOMAKI	Eija	Member	Present	
16	France	POUPART	Michel	Member	Present	
17	Germany	POHL	Reinhard	Member	Present	
18	Iran	SOROUGH	Abbar	Member		Mohsen GHAEMIAN

19	Italy	FORNARI	Francesco	Member	Present	
20	Japan	KOMAKI	Kenji	Member	Present	
21	Korea	SHIN	Dong-Hoon	Member		Absent
22	Latvia	DISLERE	Sigita	Member		Absent
23	Norway	HOLM MIDTTØMME	Grethe	Member		Suzanne LACASSE
24	Pakistan	SALIM SHEIKH	Azhar	Member		Absent
25	Portugal	CALDEIRA	Laura	Member	Present	
26	Romania	ABDULAMIT	Altan	Member		Absent
27	Russia	BELLENDIR	Evgeny	Member	Present	
28	Serbia	TUCOVIC	Ignjat	Member		Absent
29	Slovakia	PANENKA	Peter	Member	Present	
30	Slovenia	HUMAR	Nina	Member	Present	
31	South Africa	SEGERS	Ivor	Member	Present	
32	Spain	ESCUDER BUENO	Ignacio	Member	Present	
33	Sri Lanka	KAMALADASA	Badra	Member		Absent
34	Sweden	BARTSCH	Maria	Member	Present	
35	Turkey	DINCERGOK	Tuncer	Member	Present	
36	Ukraine	RUBAN	Oleh	Member		Absent
37	United Kingdom	HUGHES	Andy	Member		Absent
38	United States	BECKER	Brian	Member	Present	
39	Australia	PISANIELLO	John	Co-opted		Absent
40	Canada	HARTFORD	Des	Co-opted	Present	
41	Ethiopia	ABEBE	Michael	Co-opted	Present	
42	Japan	UEDA	Satoru	Co-opted	Present	
43	South Africa	HATTINGH	Louis	Co-opted	Present	

44	South Africa	ROBERTS	Paul	Co-opted		Absent
45	United States	CHARLWOOD	Robin	Co-opted	Present	
<b>OBSERVERS :</b> M. Abdellau, (Egypt), H. Abdelmoyi, (Egypt), M. Acharya, (Canada), L. Adeghe, (Canada), M. Afif, (Canada), J. Alfonso, (Portugal), E. Bednarova, (Slovakia), S. Berntssen, (Sweden), A. Bigras, (Canada), M. Blais-Poulin, (Canada), C. Bonete, (Mozambique), J. Bouchard, (Canada), M-C. Bouillon, (Canada), D. Capka, (USA), S. Carpentier, (Brazil), E. Carvalho, (Mozambique), J. Davis, (USA), P. Dawe, (Canada), T. Deakin, (England), O. Dickson, (Nigeria), D. Durkee, (USA), M. Fauzy, (Egypt), K. Fearon, (USA), G. Finlayson, D. Forster, (New Zealand), J. Gienow, (Canada), N. Godbait, (Canada), E. Halpin, (USA), H. Hampton, (Canada), A. Hennaoui, (Lebanon), W. Horne, (USA), I.M. Ibure, (Mozambique), G. Inci, (USA), A. Jhimley, (Bhutan), H.M. Junaid, (Sri Lanka), L. King, (Canada), A. Kirkham, (Canada), M. Klein, (Canada), K. Knight, (USA), R. Knott, (New Zealand), P. Kokoszka, (USA), M. Kudara, (Japan), S. Lazaridou, (Greece), D. Littlemore, (UK), J. Malenchak, (Canada), W. Manirakiza, (Uganda), J. Matsumoto, (Japan), K. Miller, (Canada), S. Mohanarajah, (Sri Lanka), H. Mutikemga, (Uganda), T. Oswell, (Canada), E. Peloquin, (Canada), J. Perdikiaris, (Canada), B. Peter, (Canada), R. Pike, (USA), D. Protulipac, (Canada), C. Raska, (Canada), A. Rattue, (Canada), S. Rigbey, (Canada), J. Rutherford, (USA), M. Sabido, (USA), J. Saeidi, (Canada), R. Schubak, (Canada), A. Seeds, (Canada), K. Seto, (Canada), L.M. Sidek, (Malaysia), K. Tamura, (Japan), D. Teo, (Canada), G. Thorarins, (Iceland), G. Tjoumas, (USA), T. Tsunematsu, (Japan), S. van den Berg, (Netherlands), S. Widanapathirana, (Sri Lanka), C. Williams, (USA), R. Wolfsborg, (Sweden), R. Wood, (Norway), T. Yoshiba, (Japan)						

The meeting was attended by 28 Committee members, 3 substitutes and 78 observers.

The chairman provided brief information about the items discussed during the meeting of ICOLD Board with the Chairs and Vice-chairs of Technical Committees which took place on Sunday June 9, 2019.

#### **DAM INCIDENTS E -DATA BASE AND UPDATE OF BULLETIN 99**

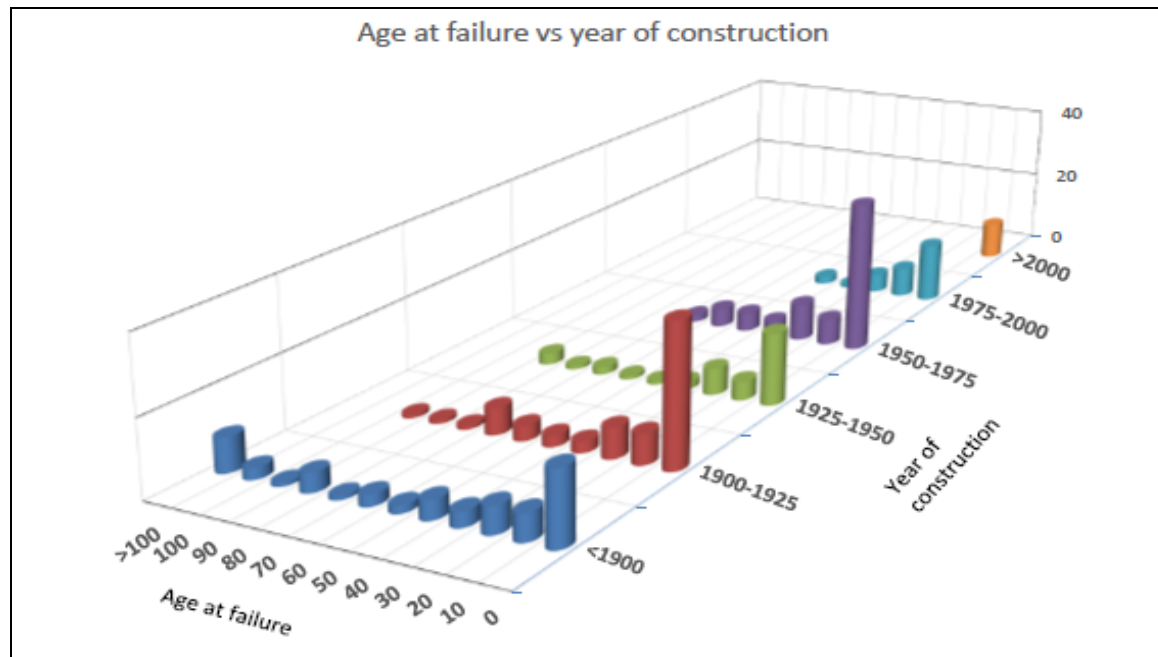
M. Poupart informed the Committee about the progress in collecting available data on this subject and the progress of work on updating Bulletin 99. The Working Group (Members: M Bartsch, I. Escuder, Y. Guodemar, H. Janssen, S. van der Berg, L. Hattingh, A. Hughes, F. Laugier, G. Midttømme, B. Wark, M. Poupart) validated 322 cases last year, decided on the contents of statistical analysis and in April of this year distributed the first draft to CODS members.

Statistical analysis of collected data includes:

1. Failures versus geographical repartition

2. Time effects: over time, year of construction, age of the dam
3. Dam type and height, reservoir size
4. Failures contexts
5. Failures modes
6. Failures causes

An example of the analysis results is displayed in the Figure below.



The next of the task will include:

- CODS members comments and suggestions (by the end of September 2019)
- National Committees comments expected in February 2020
- Working group to update the draft and organize the workshop at the DELHI Annual Meeting.
- Data Base will be incorporated in the ICOLD website

## **GUIDANCE ON ASSESSMENT OF CONSEQUENCES OR HAZARD POTENTIAL RESULTING FROM DAM FAILURE**

Leader of the Working Group (Members: D. Hartford (Canada), A. Hughes (UK), E. Isomaki (Finland), N. Humar (Slovenia), J. Needham (USA), C. Priscu (Chile), I. Segers (South Africa), H. Janssen (Liaison–Netherlands, B. Jonkman, B. Maaskant), J. Castillo Rodriguez (Spain)) S. McGrath provided the update on the progress of work. The purpose of this bulletin is to provide guidance on suggested principles and the contemporary applications and methods used for consequence analyses.

The objectives of this bulletin are to:

- Support dam managers to make informed decisions regarding the need, purpose and scope for consequence analyses; and
- Provide a basis for building a common understanding between dam managers and technical providers in specifying, and then interpreting the results from, consequence analyses.

The content of the bulleting will be based on the following principles:

- Ensure that there is an appropriate understanding of the key elements of the natural, cultural, societal and built environments that could be impacted.
- Use best practicable scientific methods.
- Undertake assessments employing professional assessors trained in the consequence being evaluated.
- Ensure that all key consequences relevant to the study are evaluated, including incommensurable and intangible consequences, and their significance reported to fully inform decision makers.
- Provide details of any vulnerable populations within the study area and the potential impacts on that population
- Provide a clear assessment of the limitations of the study methodology and how these limitations could affect the results.

The intention of the Working Group is to prepare a document that can serve many countries and therefore will need to be scalable and prepared with the awareness that consequence assessment can be carried out for various purposes.

The proposed content of the bulletin will include:

## **GENERAL CHARACTERISTICS OF CONSEQUENCE ANALYSIS**

### 1.1 General introduction

### 1.2 Principles

### 1.3 Categories (types) of consequences

### 1.4 Purposes and objectives of consequence analysis

### 1.5 Fundamentals of consequence

#### 1.5.1 System definition, system boundaries and input parameters<sup>1</sup>

#### 1.5.2 Identification and characterisation of entities at risk

#### 1.5.3 Modelling pre dam-breach system state

#### 1.5.4 Breach models

#### 1.5.5 Hydrodynamic models of floods

#### 1.5.6 Characterisation of the vulnerability of entities at risk from flooding

#### 1.5.7 Characterisation and enumeration of damage states

#### 1.5.8 Calibration, validation and verification

#### 1.5.9 Treatment of uncertainty in the analysis

### 2.1 Uses of Consequence Analysis Including Uses of Outputs (General per Country or Typical Types)

### 2.2 Details of Methods Used (General per Country or Typical Types)

#### 2.2.1 System definition, system boundaries and input parameters

#### 2.2.2 Identification and characterisations of entities at risk

#### 2.2.3 Modelling pre dam-breach system State

#### 2.2.4 Breach models

#### 2.2.5 Hydrodynamic models of floods

#### 2.2.6 Methods to characterise the vulnerability of entities at risk from flooding

#### 2.2.7 Warning and evacuation

- 2.2.8 Damage states
- 2.2.9 Static and dynamic loading
- 2.2.10 Calibration, validation and verification
- 2.2.11 Uncertainty
- 2.3 Limitations of the approaches and methods
- 3 APPENDIX 1 –Summary of responses to the consequence assessment questionnaire

## **REVIEW OF CURRENT PRACTICE OF RISK ASSESSMENT AND MANAGEMENT FOR DAMS**

Leader of the Working Group (Members: S. McGrath (Australia), P.A. Zielinski (Canada), Z. Xu (China), M. Poupart (France), H. Janssen (Netherlands), G. Baecher (United States), D. Boyer (United States), D Bowles (United States) D. Hartford provided the Committee with the update on activities following the Vienna meeting of the Committee. Since the original intent to convene a workshop of practitioners in order to capture experiences and uses proved to be impracticable, Working Group prepared and sent detailed Survey II to practitioners identified as a result of Survey I.

The Survey provided 8 suggested focus areas and 13 additional focus areas were submitted by responders. The Survey attempted to capture all of the factors influencing the use of risk assessment and the different types. It included 6 parts and the total of 53 questions

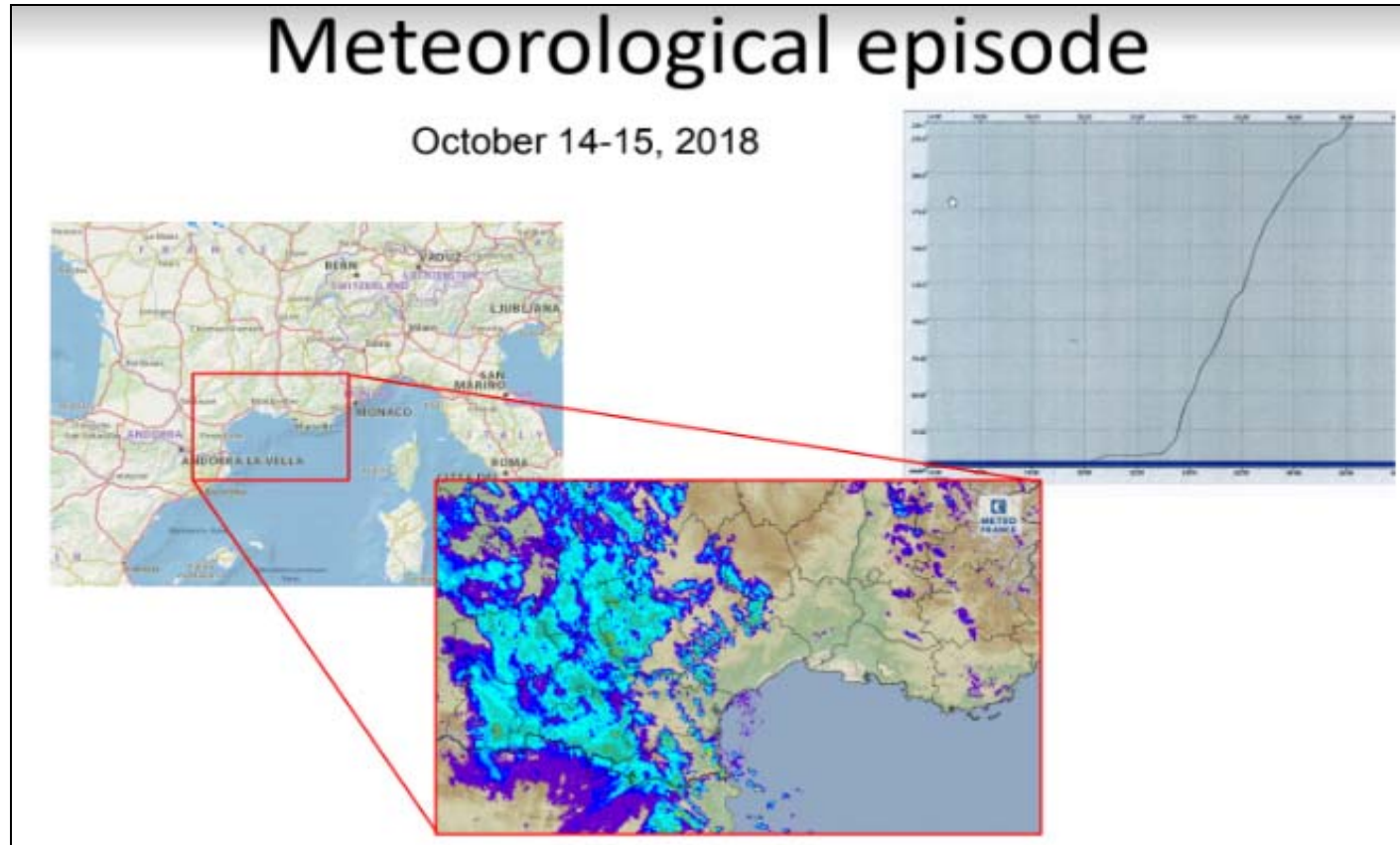
The 6 parts included:

1. Legal/regulatory framework and enforcement regime (15 questions)
2. General considerations (10 questions)
3. Risk analysis (11 questions)
4. Risk evaluation (10 questions)
5. Risk management (3 questions)
6. Risk communication (3 questions)

The next step will focus on compilation of results in a coherent format but without any interpretation or analysis of the responses. Substantial completion is expected by December 2019 and the first draft will be circulated to CODS members. Review and clarifications by CODS members is expected to be completed by the end March 2020 and subsequent Bulletin workshop at is planned to be held at the 2020 Annual Meeting in New Delhi

## **INFORMATION FROM CODS MEMBERS ON ISSUES OF NATIONAL INTEREST**

Observed damage to dams during the flash floods in the south of France in October 2018 (M. Poupart).



# Cavayère dam

- **Embankment dam (class B)**

- Height: 26 m
- Reservoir volume : 1 350 000 m<sup>3</sup>

- **October 2018 flood**

- Maximum water level = Norm. Op. Level + 2.4m
- Maximum flow rate =  $Q_p \approx 85 \text{ m}^3/\text{s}$  (T  $\approx 2\,000$  years)



Photo : Carcassone Agglo.



Photo : Carcassone Agglo.

# Cavayère dam

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- Maximum flow rate =  $Q_p \approx 85 \text{ m}^3/\text{s}$  (T  $\approx$  2 000 years)



### **CDA initiatives (D. Hartford)**

- Addressing societal dimensions of the setting of safety standards and risk criteria
- Preparation of technical bulletin on failure modes identification and analysis of their effects

### **GENERIC (REFERENCE) DAM SAFETY GUIDELINES**

Comments from several National Committees on proposed generic (re-named as reference) dam safety guidelines were provided to the CODS chair who distributed the comments to the members of the Committee. The comments were received from: Albania, Australia, Canada, Egypt, France, Germany, Japan, Netherlands, Norway, South Africa, Sri Lanka and Switzerland. To each of the comments Robin Charlwood provided e-mail responses prior to the meeting in Ottawa. Before the floor was opened for discussion, Des Hartford outlined a more detailed position of the Canadian Dam Association on the proposed draft and the major points were subsequently addressed by Robin Charlwood.

As a result of the discussion and comments provided by Committee members attending the meeting the following course of action was agreed on:

A Working Group that includes the draft authors and CODS members will be established in order to:

- re-structure the document in such a way that its alignment with recently published ICOLD Bulletins 154 and 175 is ensured,
- address and incorporate the comments received from CODS members and raised during the discussion at the Committee meeting in Ottawa
- improve the readability of the document
- considering the importance of such a document for countries developing dam safety arrangements, prepare the draft for Committee review as soon as possible with the target date no later than the end of October 2019.

J) SEDIMENTATION OF RESERVOIRS					
PROGRESS REPORT					
Meeting in Vienna, Austria, July 1, 2018, 0800-1600					
MEMBERSHIP / LISTE DES MEMBRES					
COUNTRIES/PAYS	MEMBERS/MEMBRES			Present	Absent/Substitutes
United States	TEAL	Martin	Chairman	YES	
France	PETEUIL	Christophe	Member	YES	
Indonesia	ARIYANTI	Vicky	Member	NO	Bambang Hargoro substitute
Germany	AUEL	Christian	Member	YES	New Vice-Chair
South Africa	BASSON	Gerrit	Member	NO	
Switzerland	BAUMER	Andrea	Member	YES	
Switzerland	BOES	Robert	Coop Member	YES	Called in via Skype
Russia	BORSCH	Pavel	Member*	NO	
Morocco	CHRAIBI	Ahmed	Member*	YES	
Germany	DETERING	Michael	Coop Member	YES	Called in via Skype
Iran	EMAM	Ali	Member	NO	Regrets
Spain	GONZALO	Alberto	Member	NO	Regrets
Norway	JACOBSEN	Tom	Coop Member	NO	
China	JIANG	Enhui	Member	NO	Jiang Siqi substitute
Korea	JUNG	Kwansue	Member	NO	Regrets
Austria	KNOBLAUCH	Helmut	Member	NO	Regrets
Italy	LA BARBERA	Giovanni	Member	NO	Giovanni Ruggeri substitute
Romania	POPESCU	Catalin	Member	NO	Regrets
Japan	SATO	Masatoshi	Member	YES	
India	SHARMA	Devendra	Member	YES	
Netherlands	SLOFF	Kees	Member	NO	Regrets. Amgad Omer substitute
Peru	SUAZO	Miguel	Member	YES	
Japan	SUMI	Tetsuya	Coop Member	YES	
OBSERVERS: Hirotumi OKUMURA (Japan), Ricarda LOTHMANN (Germany), Nyi Myi LWIN (Myanmar), Bo Bo KYAW (Myanmar), Htay NYUNT (Myanmar), Takashi IKEDA (Japan), Yushi AOSAKA (Japan), Sukhdeep VIG (India), Charanpreet SINGH (India), Nick Parkin (UK), Barry Cotter (UK), Brian GLOVER (Norway), Manjusha MISHRA (India), Koji TABATA (Japan)					
*Nominated, to be voted on by general assembly this week					

AGENDA OF TECHNICAL COMMITTEE J

**1. Welcome, Opening Statements, Review Agenda**

**2. Introductions**

**3. Committee Roster and Updates**

**4. Communications from ICOLD Board to the committees**

**5. 2019 Meeting Review: Sedimentation Papers**

- a. S19 T2 – Sedimentation Monitoring and Management (Room 208) 1030-1200
- b. S25 T2 – Sedimentation Modeling (Room 208) 1330-1500

**6. Review of 2019 (Vienna) Meeting Minutes & Action Items**

**7. Presentation and Review of TOR**

- A. Case studies Bulletin – status
- B. New Bypass Bulletin – review - assignments – milestones

**8. Presentations**

- A. Summary of Reservoir Sedimentation Activities in the USA; Bureau of Reclamation prize, economics report, SedHyd Conference (Teal) – 15 Min.
- C. Sediment Bypass Workshop and New Topics (Sumi) – 15 Min.
- D. Indian Activity (Sharma) – 15 Min.
- E. Dam Break Accident and Resulting Sediment Management at Downstream Dams in Lao Republic- (Aosaka) - 15 Min.
- F. Moroccan Dams (Chraibi) – 15 Min.
- G. Palanegra Bypass Tunnel (Baumer) – 15 min.

**9. Adjourn**

**Summary**

The committee completed the bulletin draft on National Regulations and Sediment Management Case Studies which will be voted on by the General Assembly this year. Assuming approval, we will incorporate comments received and submit the English version while translation will proceed on the French version. Progress is being made on the new bulletin on Design of Sediment Bypass Systems.

## Activities

In 2016 at the meeting in Johannesburg, as the last Terms of Reference (TOR) period was coming to an end, the committee discussed ideas for a new bulletin. A new TOR was therefore drafted for a) finishing the bulletin underway for National Regulations and Sediment Management Case Studies and b) starting a new bulletin on Design of Sediment Bypass Systems. The new TOR was sent to M. de Vivo on February 2, 2017 for consideration by the board at their meeting in March 2017 in Morocco. However, the TOR was not voted on and instead was pushed forward to the meeting in Prague. The committee moved forward with work on the new bulletin at last year's meeting in Prague under the assumption that the new TOR would be approved. The new TOR period is 2017-2020.

We had initially planned on giving a workshop on the new TOR in Vienna, but were advised by M. Schleiss that this would probably be redundant due to Congress Question 100 which has many papers on the state of the art of reservoir bypass systems. Therefore, no workshop was requested.

The activities over the past year have been focused on two issues – completing the “old” bulletin and working on the “new” bulletin. The “old” bulletin draft was completed and submitted to the central office for dissemination and review by the national and other ICOLD committees. Mr. Teal spent much time editing the text submitted by various members and converting to the new bulletin template to ensure speedy publication. Assuming that the draft is approved by the General Assembly, the committee will incorporate the comments received to date to produce the final bulletin in English. Meanwhile the translation to French will progress.

The new bulletin topics were previously divided into different “work packages” and different committee members assigned to work on these packages. Much progress has been made but we are behind the schedule set at last year's meeting. We are now pursuing the goal of completing the draft final in 2020 but this will not be ready in time for the meeting in India. We will therefore aim for presentation of the draft final to the central office in 2020, and finalize the bulletin in 2020 or 2021. We will request a workshop to present the bulletin at the Marseille meeting in 2021.

At this year's meeting, the agenda included customary business items (agenda items 1-4 and 6). We also had a brief discussion of the two sediment-related sessions at the symposium which should be of great interest to all committee members, and some members are presenting in those sessions as well. We then reviewed the progress and status of the bulletins (item 7) with the most amount of time spent discussing the new bulletin (item 7B). We concluded the meeting with a number of presentations by committee members and invited guests related to the reservoir sedimentation topic.

<b>K) INTERGRATED OPERATION OF HYDROPOWER STATIONS AND RESERVOIRS</b>					
PROGRESS REPORT					
Meeting in Ottawa, June 11, 2019					
MEMBERSHIP / LISTE DES MEMBRES					
COUNTRIES/PAYS	MEMBERS/MEMBRES			Present	Absent/Substitutes
China	CHEN	G.	Chairman	YES	
Brazil	VARELLA	L.	Member		
Canada	BOURGEOIS	G.	Member	YES	
China	LI	H.	Member	YES	
Cameroon	NDAM	S.	Member		
France	CHELLE	J.P	Member		
Germany	MOEDINGER	J.	Member	YES	
Iran	HEIDARI	A.	Member		
Japan	KOSAKA	K.	Member	YES	
Korea	KO	I.H.	Member		
Nigeria	ADEWUMI	J.	Member		
Norway	HONNINGSVAG	B.	Member		
Russia	GRIGOREV	A.	Member		
Switzerland	DROZ	P.	Member		
South Africa	HONNINGSVAG	B.	Member	YES	
Turkey	DEMIRBAS	E.	Member		
United States	BOWLING	D.	Member		XIONG Y.
Zambia	KAMANGA	R.	Member		MUKUKA R.
OBSERVERS: Polycarp Wong, Then Woei Yaw, Vítor Silva, Ackim Mutawa, Bornwell Sinkala, Hussein Abdelmoeti, Sivaj Abdullahi, Chang Kyun Kim, Mylene Blais-Poulin, Sulistianto, Mohamed Fawzy, Haris Z, Myung Mwn Soo, Loueie Geldenhuys, Roben Gneyling, Rajesh Chandel, Ajay Chauhan, XU Tao, LI Youping, ZHOU Xiaogian					

**Distribution list of emails**

**Official representatives (including new members):** Chen\_guoqing@ctg.com.cn; Li\_hui@ctg.com.cn; gilles.bourgeois@wspgroup.com; Jens.Moedinger@de.lahmeyer.com; kosaka.keita@e2.kepco.co.jp ; lfurstenburg@knightpiesold.com ; yxiong@rti.org ; rmukuka@zesco.co.zm

Observers: polywong@sarawakenergy.com.my; woeiyaw.then@sarawakenergy.com; vitor.silva@edp.pr; amutawa@zesco.co.zm; binkala@zesco.co.zm; husseingalal1961@yahoo.com; siraj.abdullahi@gmail.com; kim2041@gmail.com; blais.poulin.mylene@hydro.qc.ca; sulistianto@posoenergy.com; Fawzygis@yahoo.com; hariszallcornar@zsa.gmail.com; msyung@ncwer.com; lgeldenings@knightpiesold.com; rgreyling2@knightpiesold.com; Rajesh.chandel@sjvn.nic.in; aituajay11@gmail.com; XU\_tao@ctg.com.cn; zhou\_xiaoqian@ctg.com.cn, li\_youping@ctg.com.cn.

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**MEETING HELD BY THE COMMITTEE K**

Committee K held a Meeting on June 11, 2019, with nearly 30 total attendees, It included a series of presentations linked to work report of Committee K, Report on the final edition of the second bulletin, Application of On-line Monitoring in the Operation of Hydropower Stations and Reservoirs, which is related to the third TOR of Committee K, and so on.

<b>Time</b>	<b>Content</b>	<b>Speaker</b>
09:00-09:05	Opening speech	Dr. CHEN Guoqing
09:05-09:30	Committee work report	Ms. ZHOU Xiaoqian
09:30-10:00	Report on the final edition of the second bulletin	Mr. XU Tao
10:00-10:20	Posing for group pictures	All members
<b>10:20-10:50</b>	<b>Tea Break</b>	
10:50-11:00	Introduction on TOR for the third term	Mr. LI Hui
11:00-11:30	Presentation on Topic : Application of On-line Monitoring in the Operation of Hydropower Stations and Reservoirs.	Mr. LI Youping
11:30-12:30	Discussion on TOR for the third term	All members

12:30-12:45	Discussion on plan for next year's Workshop	All members
12:45-12:50	Closing speech	Dr. CHEN Guoqing

## AGENDA OF THE TECHNICAL COMMITTEE K

On June 11, 2019, Committee K meeting included the following agenda items:

- Welcome all the members and observers to committee K meeting.
- Committee K Work Report about work review in the past years, work mode's description, and work tasks and plans for the coming years.
- Presentation about the final edition of the second bulletin, include newly progress and work plans.
- Introduction on TOR for the third term, review the past two TOR and explain the third one.
- Presentation on Topic of the third TOR: Application of On-line Monitoring in the safe Operation of Hydropower Stations and Reservoirs.
- Discussion on TOR for the third term, to decide the topic for our third term bulletin.
- Discussion on plan for next year's work launching Workshop in India.
- Closing speech.

## MINUTES OF THE MEETING

This was the eighth meeting of the Committee on Integrated Operation of Hydropower Stations and Reservoirs (Committee K). After having given welcome to the Committee Members, the New Representatives, and the Observers, all the efforts made by members were appreciated. The present Chairman Dr. CHEN Guoqing has called for the approval of the Minutes of the previous meeting in Vienna and the Agenda of today's annual meeting. Both items have been approved. Dr. CHEN appreciated member's effort of the second term and of yesterday's successful workshop, he stated annual meeting's goal is to focus on the final edition of second bulletin and the TOR for the third term.

During the annual meeting, we reviewed the work had been done in the past years and main achievements of Committee K briefly. Also, the work plan for the next year was reported, include to submit the final edition of the second term bulletin to ICOLD center office and to host the 2020's work launching workshop in India. We made it clear the Technical Committee work model and give suggestions to the management of Committee K. Besides, the annual preliminary plan for the third term was introduced.

Besides, the latest progress of the second term bulletin was presented, the revisions had been made since our last discussion in Vienna was reported, and our plan for the next step was discussed. Committee members summarized and reviewed the second term bulletin together, and finally an agreement was made to submit the bulletin to ICOLD center office later of this year.

As this year is the last year of our second term, we are going to start the work of our third term. Together, we reviewed our last two TOR, and explained our third TOR in detail, after heated discussion among all committee members, the topic for our next term bulletin was determined, all members agreed that we focus on the topic named "Application of On-line Monitoring in the safe Operation of Hydropower Stations and Reservoirs" for our third term. Also the preliminary plan for 2020's work launching workshop in India was introduced. Dr. CHEN called for volunteers, who will attend 2020 ICOLD annual meeting, to present their case studies on the current situation, the facing problems and the ways and means on how to solve them in this field. Members or representatives from China, Portugal, USA and Malaysia volunteered to make presentations.

Further more, a senior engineer from China, delivered a presentation on the topic "Application of On-line Monitoring in the safe Operation of Hydropower Stations and Reservoirs". There are many dams and hydro power plants accidents occurred in recent years, and caused huge loss of life and property, so safe operation of hydropower stations and reservoirs are quite important. He introduced in detail about Why should we do, What should we do, How should we do, and shared some Chinese Cases.

G.Q.CHEN

Chairman



# MEETING RECORD

## ICOLD COMMITTEE L - TAILINGS DAMS & WASTE LAGOONS

### Ottawa June 2019

**Date & time:** Tuesday June 11<sup>th</sup>, 08:30-16:00

**Location:** Shaw – room 207

**Minutes prepared by:** Annika Bjelkevik

**Distribution:** All

**Attachments:**

E-mail list of participants

Member Country Slides

COUNTRIES	MEMBERS			Present	Absent/ Substitutes	Country slides
Canada	Mr. H. McLEOD	HMCL	Chairman	X		
Sweden	Ms. A. BJELKEVIK	AB	Vice-Chair	X		X
Australia	Mr. D. BRETT	DB	Member	X		X
Brazil	Mr. J. PIMENTA DE AVILA	JPA	Member	X		
Czech Republic	Mr. J. Herza	JH	Member	X		oral
Chile	Mr. J. TRONCOSO	JT	Member	X		X
China	Mr. H. ZHOU	HZ	Member	X		X
Colombia	Mr. A. MARULANDA	AM	Member			
Finland	Mr. T. REGINA	TR	Member	X	Substitute: Heli Nurmi	oral
France	Mr. F. BROUSSET	FB	Member	X		oral
Germany	Mr. K. KAST	KK	Member		Absent	
India	Mr. V.K. GUPTA	VKG	Member		Absent	
Iran	Mr. M. ASKARI	MA	Member	X	Substitute: Hamidreza Tammannaee	X
Romania	Mr. E. LUCA	EL	Member		Absent	
Russia	Ms. E. FILIPPOVA	EF	Member		Apologies	
Slovakia	Mr. M. BAKES	MB	Member		Apologies	
South Africa	Mr. D. GRANT-STUART	DGS	Member	X		oral
Spain	Mr. J.L. JUSTO	JLJ	Member		Absent	
United Kingdom	Mr. R. MONROY	RM	Member	X		X
United States	Ms. T. ALEXIEVA	TA	Member	X		X
Zambia	Mr. P. KAMPENGELE	PK	Member		Absent	
Canada	Mr. A. SMALL	AS	Co-opt member	X		X

**OBSERVERS:** approximately 70 people (names listed in the e-mail list of participants)

ITEM	DISCUSSION	Action by	By Date
	<p><b>TAILINGS DAM ACTIVITIES AT ICOLD 2019:</b></p> <p><b>Ad hoc Working Group Meetings – Bulletins, Saturday June 8 Monday June 10</b></p> <p><b>CDA Workshops on Tailings Dams, Sunday June 9, 08:30-16:00</b></p> <p><b>Tailings Committee Workshops, Monday June 10, 14:00-16:30</b></p> <ul style="list-style-type: none"> <li>○ Tailings Technology Bulletin Presentation</li> <li>○ New Bulletin – Tailings Dam Safety</li> <li>○ New Bulletin – Tailings Dam Surveillance</li> </ul> <p><b><u>TAILINGS COMMITTEE MEETING:</u> Tuesday June 11, 08:30-16:00</b></p> <p><b>Tailings Dam Governance – Workshop with MAC, Friday June 14, 09:00–12:00</b></p> <p><b>Tailings Research Workshop, Friday June 14, 1:30-16:00</b></p>		
<b>1</b>	<b>WELCOME AND INTRODUCTIONS</b>		
	Chairman welcomed all attending members, alternates and observers.		
1.1	Vice Chair appointed meeting secretary.		
1.2	Agenda was approved.		
1.3	Introduction of Jiri Herza as a new member representing Czech Republic as well as all observers.		
<b>2</b>	<b>ATTENDANCE AND APOLOGIES</b>		
2.1	Attendance of a total of 14 members, of which 2 were substitutes (see 2.2). In total 83 people attended the meeting, including 69 observers.		
2.2	Apologies for not being able to attend were received from 2 countries (Finland and Iran) of which one country sent a substitute A list of e-mails for all participants is attached.		
<b>3</b>	<b>APPROVAL OF MINUTES FROM VIENNA MEETING, 2018</b>		
	The minutes of the 2018 Vienna meeting were accepted.		
<b>4</b>	<b>INFORMATION FROM THE ICOLD CHAIRPERSON'S MEETING</b>		
	Chairman and Vice Chair attended the ICOLD Chairman's meeting held on June 10 and reported on related information to the members, which included: The ICOLD Bulletin are published by Balkema Press. Non-members press the "non-member"-button and get to the Balkema site. Members get a free copy. The preparation process of ICOLD Bulletins is being reviewed.		
<b>5</b>	<b>RELEVANT WORK OF OTHER GROUPS</b>		
5.1	<b>General</b>		
5.2	<b>Reports on Work of other ICOLD Committees</b> Reports from other committees (reported at the chairperson's meeting) relevant to this committee below: <i>(the period for terms of reference for each committee is given in ( ))</i>		

ITEM	DISCUSSION	Action by	By Date
A	COMPUTATIONAL ASPECTS OF ANALYSIS AND DESIGN OF DAMS (2017-20)		
B	SEISMIC ASPECTS OF DAM DESIGN (2017-20) Two significant earthquakes; one in Peru (magnitude 8) and Philippines (magnitude 6.2 and 6.5). They have given seminars in earthquake countries like India, Philippines, Cambodia and Laos. Working on a Bulletin where earthquake data from dam sites will be compiled.		
C	HYDRAULICS FOR DAMS (2019-22)		
D	CONCRETE DAMS (2018-21)		
E	EMBANKMENT DAMS (2017-20)		
F	ENGINEERING ACTIVITIES WITH THE PLANNING PROCESS FOR WATER RESOURCES PROJECTS (2014-17)		
G	ENVIRONMENT (2017-20)		
H	DAM SAFETY (2018-21) The committee is working on three Bulletins; Collecting data on dam failures; assessment of consequences of dam failures; review of risk management practice. The last will be an update of Bulletin 130 Risk Assessment in Dam Safety Management. A reconnaissance of Benefits. Methods and Current Applications.		
I	PUBLIC SAFETY AROUND DAMS (2016-19)		
J	SEDIMENTATION OF RESERVOIRS (2017-20)		
K	INTEGRATED OPERATION OF HYDROPOWER STATIONS AND RESERVOIRS (2015-19)		
L	TAILINGS DAMS & WASTE LAGOONS (2017-20)		
LE	LEVEES (2018-2021)		
M	OPERATION, MAINTENANCE AND REHABILITATION OF DAMS (2017-20) Bulletin 168 Recommendations for Operation, Maintenance and Rehabilitation is finished. A new topic is investigation and construction under water.		
N	PUBLIC AWARENESS AND EDUCATION (2018-21)		
O	WORLD REGISTER OF DAMS AND DOCUMENTATION (2017-20) A comparison of the ICOLD dam register with other registers as well as a quality control of the register is ongoing. They will also create a database for all ICOLD activities (such as seminars, workshops etc.) and find links to the register of dams.		
P	CEMENTED MATERIAL DAMS (2017-20) Three Bulletins to be finished in 2020: Artificial fills (correct??); Rock fill concrete and cemented soils in dams (CSD).		
Q	DAM SURVEILLANCE (2017-20) Communication with several other committees who are incorporating different methods for surveillance.		
RE	RESETTLEMENT DUE TO RESERVOIRS (2018-2021)		

ITEM	DISCUSSION	Action by	By Date
	<p><b>S FLOOD EVALUATION AND DAM SAFETY (2015-20)</b> Building up a database of major floods internationally.</p> <p><b>T PROSPECTIVE AND NEW CHALLENGES FOR DAMS AND RESERVOIRS IN THE 21st CENTURY (2017-20) (AD HOC Committee)</b> Working on three different Bulletins; xxx; Low hazard, small dams and innovative reservoirs for flood mitigation.</p> <p><b>U DAMS AND RIVER BASIN MANAGEMENT (2018-21)</b> Differences between countries. Defining a methodology to manage stakeholders is a challenge. The committee is trying to define the gaps and fill those.</p> <p><b>V HYDROMECHANICAL EQUIPMENT (2016-19)</b></p> <p><b>W SELECTION OF DAM TYPE (2015-2018) (AD HOC Committee)</b></p> <p><b>X FINANCIAL AND ADVISORY (AD HOC Committee)</b></p> <p><b>Y CLIMATE CHANGE (2017-21)</b> Changes within the committee, vice chair position is open. Africa is not represented in the committee. Climate change is an interconnected topic and the committee is connecting and collaboration with other organizations such as; IBBS, world bank, IHA etc. The committee is looking at extreme events evolution and climate education.</p> <p><b>Z CAPACITY BUILDING AND DAMS (2017-21)</b> The committee is now a regular committee and work on implementing programs and plans. Focus is; Capacity building in dam safety management; How to improve exchange; Dam technology courses and PhD programs.</p> <p><b>ZX1 REGIONAL CLUB</b></p> <p><b>ZX2 YOUNG ENGINEERS</b> A mentor program is developed for young engineers and activities are arranged through LinkedIn.</p> <p><b>ZX3 ICOLD BOARD</b></p>		
<b>6</b>	<b>CURRENT WORK OF THE COMMITTEE</b>		
6.1	<p><b>Bulletin: Tailings Technology Update</b> Chairman quickly went through the presentation from the Tailings WS June 10. Presentation attached to the minutes.</p>		
6.2	<p><b>Tailings Dam Register and Dam Incident database</b> <u>Tailings Dam Register:</u> The register was just mentioned. Many countries still have not reported their dams. (Church of England have managed to do more in 45 days)</p> <p><u>Dam Incidents:</u> Dam incidents were not discussed. (AS distributed the CDA register to participants at the Short course on Sunday.)</p>	<b>ALL</b>	
6.3	<p><b>New Bulletin: Tailings Dam Safety</b> Mike Davies – shortly repeated the actions started within ICMM with respect to the initiative by the Church of England etc. The cooperation between the international organisations are important.</p>	<b>HMCL</b>	

ITEM	DISCUSSION	Action by	By Date
	<p>A Bulletin on Dam Safety is of value to the industry world wide as all information (that is out there) is not so visible. The committee started the work last year, before the work of ICMM, but will aim to tie it into the current work of ICMM with a global tailings standard. The focus will be on safe design with focus on technical aspects. Presentation attached to the minutes.</p> <p>During the afternoon discussions were held in three groups;</p> <ol style="list-style-type: none"> <li>1) Governance, Engineer of Record (EoR) and capacity building;</li> <li>2) Consequence classification and design criteria, Dam break and Emergency Preparedness Planning (EPP);</li> <li>3) Geotechnical factors of design</li> </ol> <p>The outcome from these discussions will be worked into the Bulletin.</p>		
6.4	<p><b>New Bulletin: Surveillance and Monitoring</b> Short information on the ongoing work. Important to understand failure modes and responses related to those. A Bulletin (180 Dam Surveillance - Lessons learnt from case histories) was published last year by Committee Q Dam Surveillance.</p> <p><b>Working group:</b> AS, PK, RM, TA, DB <b>Review group:</b> HMCL, RM and AB</p>	AS/ HMCL	
7	<b>TASK FOR 2018/2019 (refer also to 6 above)</b>		
7.1	<p><b>Schedule for next Bulletin, etc.</b> Drafts of the two new Bulletins are planned to be complete by 2019.</p>		
7.2	<p><b>New items</b> Non.</p>		
8	<p><b>CURRENT ITEMS OF INTEREST IN TAILINGS, INCLUDING ACTIVITIES OF NATIONAL COMMITTEES AND ASSOCIATED ORGANIZATIONS (ICMM, SANCOLD, ISSMFE, ANCOLD, CANCEL, USCOLD ETC.)</b></p> <p>DB – Reported on the <b>Cadia</b> dam failure. Independent report released recently. There is a movie on YouTube. No trackable/visible indications until the day before the failure, when cracks were seen. Strain softening in the weak layer in the foundation + stress reduction in the tailings. (presentation in the Australian country slides)</p> <p>Jorge Troncoso, Chile, presented their Transparent Tailings Initiative, transparent monitoring and early warning system for tailings facilities. Presentation attached to the minutes.</p> <p>Presentations of current activities of the member countries were given by the countries according to the list of participants. Presentations attached to the minutes.</p>		
9	<p><b>OTHER BUSINESS</b> No other business was put forward --- meeting was adjourned. The next ICOLD meeting (27th Congress - 89th Annual Meeting) will take place in Marseille, France, on 5 to 11 June 2021.</p>		



COMMISSION INTERNATIONALE  
DES GRANDS BARRAGES  
INTERNATIONAL COMMISSION  
ON LARGE DAMS

Icold Committees - Comités CIGB  
Technical Committee LE  
LEVEES

## Technical Committee Meeting - **Tuesday June 11<sup>th</sup> 2019**

Remy Tourment (chair)

Elena Sossenkina (vice chair)

Robert Slomp and Adrian Rushworth : session secretaries

Participants	Member	Country
Wu Aiqing	yes	China
Jaromir Riha	yes	Czech
Remy Tourment (chair)	yes	France
Amir Farid Mojtahedi	yes	Iran
Hirotooshi Mori	yes	Japan
Elias Baptista	yes	Mozambique
Marcel Bottema	yes	Netherlands
Priska Hiller	yes	Norway
Altan Abdulamit	yes	Romania
Malcolm Barker	yes	Australia
Jonathan Simm	yes	UK
David Bouma	yes	New Zealand
Reinhardt Pohl	Yes	Germany
Andrea Balestra	no	Switzerland
Robert Slomp	no	Netherlands
Scott Raschke	no	USA
Adrian Rushworth	no	UK
Joe Groeneveld	no	Canada
Shunsuke Sako	no	Japan
Paul Royet	no	France
Narayan Pokhrel	no	Canada
Mathieu Lemay	no	Canada
Sorin Nichalae	no	Romania
Qinghua Wu	no	China
Mike Sharp	no	USA
Craig Mitchell	no	Canada
Michel Dolbec	no	Canada
Mark Morris	no	France
Noah Vroman	no	USA
Cees Henk Oostinga	no	Netherlands

representing Christian  
Holzgang

Representing Andy  
Small

## Members attendance:

Country	Member (appointed by national committee)	Monday morning work	Monday afternoon work	Tuesday meeting	
China	Aiqing, WU	no	no	yes	
Romania	Altan Abdulamit	no	no	yes	
Iran	Amir Farid Mojtabedi	Yes	yes	yes	
Canada	Andy Small	yes	yes*	yes*	represented by Joe Groeneveld
Switzerland	Christian Holzgang	yes*	yes*	yes*	represented by Andrea Balestra
New Zealand	David Bouma	yes	yes	yes	
Poland	Edmund Sieński	no	no	no	
USA	Elena Sossenkina	no	yes	yes	
Mozambique	Elias Baptista	yes	yes	yes	
Japan	Hiroto Mori	yes	yes	yes	
Czech Republic	Jaromir Riha	yes	yes	yes	
Spain	Jessica Castillo Rodriguez	no	no	no	
England	Jonathan Simm	yes	yes	yes	
Netherlands	Marcel Bottema	yes	yes	yes	
Argentina	Maria Elisabet Pardini	no	no	no	
Egypt	Marawan Shahin	no	no	no	
Belgium	Patrik Peeters	no	no	no	
Norway	Priska Hiller	Yes	yes	yes	
Germany	Reinhard Pohl	yes	yes	yes	
France	Rémy Tourment	Yes	Yes	Yes	
Korea	Sung Eun, Cho	no	no	no	
Russia	Togo Issa	no	no	no	
Deputies					
Norway	Martin Nørman Jespersen	no	no	no	
USA	Noah Vroman	no	yes	yes	
Co-Opted members					
Australia	Malcolm Barker	yes	yes	yes	

## Agenda

Please see the power point sheets for more detail.

The minutes of last year's meeting and workshop in Vienna were approved.

All attendees introduced themselves

Reminders about the TC work (ICOLD shared web space, active membership, mirror groups, membership in other TCs and WGs, ...).

*Rémy Tourment*

Quick update on the situation of levees in the member countries (see questionnaire sent before meeting): National Committees and levees, information on the members' countries

*All*

Levee situation report: Information on the availability of the EUCOLD/USSD report

*Rémy Tourment*

Levee situation report: Work on the new expanded version by the TC

*Marcel Bottema and Robert Slomp*

Dams-Levees comparison report

Presentation of the current draft report

Interactive session to discuss specific issues

*Jonathan Simm*

Initial discussion on levees databases (including failure databases and links with dams)

*Paul Royet and Rémy Tourment*

The presentation on Levees in China was delivered at the end of the session, as Professor WU Aiying was not able to attend the previous day of workshops.

Minutes of the Vienna workshop and meeting were approved.

Reminder of the terms of reference and two deliverables of the Technical committee.

Monday morning we covered the Dams and Levees inter comparison report and a session on risk informed design.

Yesterday afternoon we had a number of presentations on flood events in the world related to levees.

Goals today

- Share and discuss progress on the objectives and deliverables of the TC
- Discuss the two deliverables
- Dams and Levees inter comparison report
- Inventory report on levees (more or less a business case)

We discussed the organization of the TC and how it works. It is insisted that an actual activity of members is essential, with reference to the ICOLD TC guidelines.

A question to each member country

- Can each country organize a national backing group?

The resources of the TC are presented and discussed:

- ICOLD shared webspace
- Link with the EU cold Levee Working Group
- National groups and backing groups
- Meetings and workshops

On writing the documents:

- Please use the new ICOLD bulletins templates that are available on the ICOLD web site, in our shared web space, and that we also disseminated by email.
- **Action:** Jonathan Simm will make instructions on how to use the shared space on the ICOLD web site so each will have an overview on which document is the latest version, without deleting the originals. Also, Jonathan Simm to send proposal for folder structure for intercomparison report on ICOLD shared space.

Please note. Only country members have access to the shared web space.

EU working group site is an easier place to disseminate documents to all participants from your own country backing group.

Please do not delete files from the Icold shared webspace. There is no reserve copy. The webspace also gives you information on members of other TCs so you can make contact easily.

**Country updates by**

USA

China

Czech Republic  
Netherlands  
Japan  
New Zealand,  
Norway  
Switzerland '  
Mozambique  
Australia  
England  
Canada  
Iran  
Romania  
France

### **Marcel Bottema: Levee inventory report**

This document will add on to the European inventory report with a chapter from the USA.

The main aim is to demonstrate relevance of levees in terms of flood risk and their quantity. And the aim is in line with aim of TC in the exchange of knowledge. All chapters to be prepared using ICOLD bulletin format. Existing chapters may need to be reviewed to ensure there is no ambiguity in the text. Progress: Some countries have sent in chapters others have promised chapters. 11 countries have not responded yet.

Time schedule: The aim is to have a 80% version in march. This is important to discuss it in April in New Delhi.

There were discussions about

- the new ICOLD document format we have to implement.
- New subjects, how to include this since a number of the country chapters have already been written
  - Include these if they are relevant for your country
  - Definition about what we mean by safety
    - Safety of people at risk
    - Safety from vandalism and other similar issues
- the level of detail
- tasks of the editorial team
- for the French translation- focus on the general chapters. This is the advice of the French committee of ICOLD.
- Who is the audience?
  - ICOLD members
  - People interested in levees and/or dams, hydraulic structures in general

Can we meet deadline for early March 2020? We need a month to prepare the last chapter. The following agreed in principle

- Romania
- Iran
- UK
- Australia (internal review may take time, Ancold)
- Switzerland (no major revisions)
- Germany (will revise some minor points)

- Norway (is already provided, waiting for feedback)
- New Zealand
- Japan
- Czech republic (will revise some minor points)
- China (is already provided, want to check it again)
- USA (no major revisions)

No information yet

- Canada
- Mozambique

We will contact other countries separately who are not here today. Remy will circulate a paper about volunteers for the each of the tasks.

Presentation a discussion on **databases on levees and levee failure by Paul Royet**

This is a initial presentation to sensibillize the members but we need to have a discussion of the goal of such a database and the constraints of having such a database.

Jonathan Simm gave a presentation on the current draft report of the **Dams-Levees comparison report**. Jonathan summarized feedback from Monday's workshop session. This was followed by an interactive session to discuss specific issues.

Remy will contact other TC chairs to inform them that they may be contacted by chapter leads about common issues.

**Presentation by Elena Sossenkina on Risk informed design**

Reactions to the presentation.

- Give a context to the questionnaire
- Please make the questionnaire elaborate risk and probability of failure separately
- Is it Risk informed design or decision making? Is the title wrong?  
Explain the question more clearly.

Meeting agreed that the proposal was of interest. Results could be included as an appendix to the Levee situation report.

About 2 sides was the suggested size. Mike Sharp will circulate the information from the recent workshop held at HR Wallingford.

**A glossary with definitions.**

- We need to combine ILH and ICOLD definitions and specify where we need this.

This is a two stage process

- Stage one - The absolute minimum that we need to publish the two reports E.g. 5 to 10 words per chapter
- Stage two – more comprehensive exercise for the long term

**Amir Farid Motahedi Levee related events;**

Please see the power point sheets

Sessions to add to the list:

- The working group session is in Crete on September 30<sup>th</sup> and October 1<sup>st</sup> 2019
- Jonathan Simm also mentioned the Flood Risk conference in Budapest where knowledge can be exchanged on levees and flood risk.  
<https://floodrisk2020.net/>
- November 2020 conference.  
Protections – part of the proposed working group on erosion. Mark Morris to send information
- Flood plain management, Australia  
**Actions for all:** Please send the details of the events to Remy Tourment – to adapt the website.

Remy circulated a copy of abstracts from the conference Dignes 2019 held in Aix.

Remy thanked to Amir for his presentation.

Jonathan Simm thanked Remy for being the chair today and Robert and Adrian for taking notes

Remy would like to thank the participants and the people who presented today and yesterday.

**Action Remy** will include the presentations with the notes of the meetings

## **ICOLD 2019, Ottawa, Ontario, Canada**

### **Committee M -- Operation, Maintenance, and Rehabilitation of Dams**

#### **Workshop Minutes**

10 June 2019

A workshop was held in the afternoon (14:00 to 16:00) to develop a new Terms of Reference for the committee, since the current terms that formed the reenergizing of the committee has been nearly completed and it has been decided to continue the committee.

Alain Yziquel provided an update on the committee's recent history. ToR 1 has been published; ToR 3 is in translation into French; and ToR 2 should be completed in this coming year - 2020. Case studies are still needed for addition to ToR 2 – underwater inspection and underwater construction.

Defining ToR 4 based on the discussions in this workshop. Two tracks need to be investigated:

- I. Lessons Learned from Rehabilitation Works - Identification of Operation and Maintenance Failure
- II. River Management for Dam Construction –in conjunction with Committee E, Embankment Dams.

Dan Johnson gave a presentation on River Management and this followed with an interesting discussion of risk allocation, public perception, tolerable levels of risk, and needed participants in establishing design/construction risk.

Discussion amongst the many attendees followed on individual experiences with management of water and risk allocation. It was agreed to develop subcommittee member roster and engage with Committee E on the development of the bulletin.

#### **Meeting Minutes**

11 June 2019

The Committee M meeting commenced about 09:00 with an introduction of attendees, committee members, substitutes, and attending interested persons. Thirty nine participants were present and completed a sign-in sheet. A few countries provided representation that have not been regular participants in recent Committee M meetings.

An update was presented on organization improvements for the committees:

- A set of committee guidelines, “Guidelines for Technical Committees, May 2018”, has been developed to provide smoother and uniform process to be members, to access

committee information on the website, and to develop, complete, translate, and publish bulletins.

- ICOLD has contracted with a publisher to manage the bulletin completion. Each bulletin will be transferred to an E-BOOK format that will enable completed bulletins to be loaded to the website upon completion of the English document. As the translation to French is completed, that version will be added to the E-BOOK. Finally, the bulletin will be published in both languages.
- New templates for all bulletins have been distributed from the Central Office, so new bulletins should use the new format.
- Login to the Share Space is working properly has been improved and access is possible by all official committee members. There is a document that will be sent to members that provides instructions about how to establish and access the Share Space link.

#### Update on ToRs.

ToR 1 – Completed and translated to French in 2017. It is identified as Bulletin 168. Both English and French versions are published by E-BOOK and hardcopy.

ToR 3 – Issued in English on the ICOLD website. Translation to French is completed. A cover photo was selected from 12 submitted photos. The selected photo is of an outlet tower/morning glory spillway in Wales. The bulletin number has been updated to Bulletin 179.

ToR 2 – The two bulletins, separated from the single text after the 2018 meeting, were discussed and the subcommittee members participated in completion of the texts. Case studies were discussed and several were selected for use in the bulletins. More case studies will be supplied.

The case study format submitted by Ezio Baldovin was voted to be used for all case studies. Volunteers to develop construction case studies are Frank Immel, Scott Korab, Raphael Leroy, Steven Fox, and Holger Haufe. Inspection case studies volunteers are Shugyang Li, Scott Korab, Christine Noret, S. Mohanaraajah, and Zakharin Evgeny, Case studies to be presented and submitted by 30 September 2019 to Alain by email.

Cover photos for ToR 2 are to be sent by email to Alain by end of September 2019 and final decisions will be made in October 2019 on the cover photo.

For case studies, the format must be approved by ICOLD – if approved, then a procedure will be established to enable the photos to be separate from the text, as required by the publisher. Alain Yziquel will investigate and resolve.

Working Group for ToR 2 update:- Mickey Davachi (leader), Frank Immel, Ezio Baldovin, Cem Aker, Scott Korab, Dalibor Kratochvil, Hirotohi Nakayama (Mariko Uno), Dan Johnson, and Alain Yziquel.

Subcommittee member's addresses: [mmdavachi@yahoo.ca](mailto:mmdavachi@yahoo.ca); [kratochvil@pod.cz](mailto:kratochvil@pod.cz); [caker@dolsar.com.tr](mailto:caker@dolsar.com.tr); [hirotoshi\\_nakayama@kyuden.co.jp](mailto:hirotoshi_nakayama@kyuden.co.jp); [m-uno@wjec.co.jp](mailto:m-uno@wjec.co.jp); [fimmel@gdiving.com](mailto:fimmel@gdiving.com); [ezio.baldovin@geotecna.it](mailto:ezio.baldovin@geotecna.it); [scott.korab@ballardmc.com](mailto:scott.korab@ballardmc.com); [Alain.yziquel@arteliagroup.com](mailto:Alain.yziquel@arteliagroup.com); [dan.johnson@consultant.aecom.com](mailto:dan.johnson@consultant.aecom.com)

#### ToR 4 – River Management for Dam Construction

2020 task - Prepare outline, develop subcommittee members, and prepare a proposal for ICOLD Board

Subcommittee: Finn Midboe, Mickey Davachi, Dan Johnson, Christine Noret, Committee E (Dave Paul), A subcommittee chairperson was not selected, but Dan Johnson will be acting chairperson for Committee M.

#### ToR 5 – Lessons Learned from Remediated Works – technical/operational

2020 task - Prepare outline, develop subcommittee members, prepare proposal for ICOLD Board  
Subcommittee: Alain Yziquel, Steven Fox, Peter Pyke, Zakharin Evgeny. A subcommittee chairperson was not selected, but Alain Yziquel will be acting chairperson.

Subcommittee member's addresses: [mmdavachi@yahoo.ca](mailto:mmdavachi@yahoo.ca); [Alain.YZIQUEL@arteliagroup.com](mailto:Alain.YZIQUEL@arteliagroup.com); [dan.johnson@consultant.aecom.com](mailto:dan.johnson@consultant.aecom.com); [peter.pyke@gmail.com](mailto:peter.pyke@gmail.com); [Christine.noret@tractebel.engie.com](mailto:Christine.noret@tractebel.engie.com); [evgeny.zakharin@mc-bauchemie.ru](mailto:evgeny.zakharin@mc-bauchemie.ru); [steven.fox@ghd.com](mailto:steven.fox@ghd.com); Dave Paul ([David8676@comcast.net](mailto:David8676@comcast.net));

#### Presentations

Finn Midboe video on cofferdam failure in Norway, Raphael Leroy on Swiss dam underwater bulkhead installation (on YouTube), Mickey Davachi on 1996 Quebec flooding and Kenogami Dam Replacement.

The meeting concluded about 16:25.

#### Schedule (2019 and 2020)

July 30 – Craig Goff to submit Wales dam photo in high-definition to Alain Yziquel

July 30 – Alain Yziquel to confirm use of case study format and process for ensuring publisher can receive the text and photos appropriately.

July 30 – Dan Johnson to report back to ToR 4 subcommittee on relationship and working group development with Committee E

September 30 – Case studies for ToR 2 to be submitted by Scott Korab, Frank Immel, Rahael Leroy, Steven Fox, and Holger Haufe

September 30 – ToR 2 cover photos (both of construction and inspection) to be submitted to Alain Yziquel by ToR 2 subcommittee members, and others

September 30 – Dan Johnson to provide ToR 4 draft outline (developed by joint working group) to working group for review and comment

November 15 – Alain Yziquel to provide Tor 5 draft outline to working group for discussion and comment

March 1 – Alain Yziquel and Dan Johnson to have ToR 4 and Tor 5 Working Group results of draft outlines and proposals for submittal to ICOLD Board for approval

M) OPERATION, MAINTENANCE AND REHABILITATION OF DAMS				M) EXPLOITATION, ENTRETIEN ET REHABILITATION DES BARRAGES		
PROGRESS REPORT				RAPPORT D'ACTIVITÉ		
Meeting in Ottawa, 11 June 2019				Réunion à Ottawa, 11 juin 2019		
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion		
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Excused	Substitutes
FRANCE	Yziquel	Alain	Chairman	X		alain.yziquel@arteliagroup.com
USA	Johnson	Daniel	Vice-C.	X		dan.johnson@aecom.com
SOUTH AFRICA	PYKE	P.D.	Vice-C.	X		peter.pyke@gmail.com
TURKEY	AKER	Cem	Member			caker@dolsar.com.tr
ITALY	Baldovin	Ezio	Member		X	ezio.baldovin@geotecna.it
CANADA	Davachi	Mickey	Member	X		mmdavachi@yahoo.ca
GERMANY	Dr. Haufe	Holger	Member	X		hh@hydroprojekt.de
AUSTRALIA	Fox	Steve	Member	X		<a href="mailto:steven.fox@ghd.com">steven.fox@ghd.com</a>
UNITED KINGDOM	Goff	Craig	Member	X		c.goff@hrwallingford.com
RUSSIA	Katunin	Alexander	Member			cbnn06@yandex.ru
NORWAY	Konow	Thomas	Member		X	<a href="mailto:reider.birkeland@statkraft.com">reider.birkeland@statkraft.com</a>
CZECH REPUBLIC	Kratochvil	Dalibor	Member	X		kratochvil@pod.cz
SWITZERLAND	Leroy	Raphael	Member	X		raphael.leroy@alpiq.com
CHINA	Li	Shuguang	Member	X		lisg03@hotmail.com
SWEDEN	Midbøe	Finn	Member	X		finn.midboe@hydroterra.se
JAPAN	Mukouhara	Hideki	Member			Hideki_Mukouhara@kyuden.co.jp
SPAIN	Ortega	Eduardo	Member			eduardo.ortega@viesgo.com
ROMANIA	Sarghiuta	Radu	Member			radu.sarghiuta@utcb.ro
BRAZIL	SILVEIRA	J.F.	Member			sbbinstrumentacao@gmail.com
USA	Korab	Scott	co-opted	X		scott.korab@ballardmc.com
SWEDEN	Per	Elvnejd	Member			per.elvnejd@skelleftealven.se
SPAIN	Perez Cecilia	Diego	Member			dperezcecilia@canaldeisabelsegunda.
IRAN	Yousefi	Saied	Member			sdyousefi@ut.uc.ir
Austria	Netzer	Elmar	Observers	X		elmar.netzer@illwerke.at
Canada	MacDonald	Scott	Observers	X		scottsmacdonald@mail.com
Canada	Mercier	Vincent	Observers	X		vincent.mercier@wsp.com
Canada	Gacek	Julian	Observers	X		julian.acek@wsp.com
Canada	Bigras	Annick	Observers	X		bigras.annick@hydro.qc.ca
Canada	Correa	Claudia	Observers	X		correa.claudia@hydro.qc.ca
Canada	Meunier	Stephan	Observers	X		meunier.stephane@hydro.qc.ca
Canada	Fabrizi	Marco	Observers	X		Fabrizi.marco@hydro.qc.ca
Canada	Snyder	Greg	Observers	X		greg.snyder@snclavalin.com
Egypt	Abdelmoti	Hussein	Observers	X		husseinqlal1961@yahoo.com
France	Noret	Christine	Observers	X		Christine.noret@tractebel.engie.com
Japan	Yamamoto	Hiraki	Observers	X		hrk-yamamoto@yachiyo-en.co.jp
Mozambique	Cuna	Ivan	Observers	X		ivancunaa@yahoo.com
Perou	Ardiles	Rolando	Observers	X		rardiles@osinergmin.gob.pe
Perou	Michola	Jaime	Observers	X		jmichola@osinergmin.gob.pe
Russia	Zakharin	Evgeny				evgeny.zakharin@mc-bauchemie.ru
Sri Lanka	Mohanarajah	S	Observers	X		mohanarajah1960@gmail.com
Sri Lanka	Aruppola	SRK	Observers	X		aruppola@yahoo.com
Sri Lanka	Junaid	H.M	Observers	X		hmjunaid@yahoo.com
Sweden	Rytinieni	Tommy	Observers	X		tommy.rytinieni@lkab.com
Sweden	Pettersson	Jan	Observers	X		jan.pettersson@lkab.com
Sweden	Isander	Anders	Observers	X		anders.isander@uniper.energy
UK	Girlin	Bill	Observers	X		bg@hydropower.org
USA	Immel	Frank	Observers	X		fimmel@gdiving.com
USA	Hugues	Dennis	Observers	X		dennis.hughes@usace.army.mil

N) PUBLIC AWARENESS AND EDUCATION				N) DE L'INFORMATION DU PUBLIC ET DE L'ÉDUCATION	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in Ottawa, Canada 11 June 2019				Réunion à Ottawa, Canada 11 June 2019	
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
New Zealand	MULVIHILL	P.	Chairman	√	
Spain	POLIMON	J.	Vice Chairman		Apologies
Netherlands	van WESTEN	C.J.	Member		√
Iran	FARHANGI	B.	Member		√
Canada	RASKA	Mrs C.	Member	√	
France	LAYRAC	X.	Member		√
China	LI	T.	Member		Yang Jun
Norway	MOLLER	I.	Member		√
Japan	MORIKITA	Y.	Member	√	
Sweden	SJODIN	G.	Member		A Islander
India	VARMA	C.V.J.	Member		√
Brazil	ZYDAN SORIA	M.	Member	√	
United States	BARNES	Mrs M.	Co-opted		Apologies
United States	Ragon	Mrs R.	Member		K A Ferguson
Czeck Republic	Zukal	M.	Member	√	
Sri Lanka	KAMALADASA	Mrs. B.	Member		Apologies
Emannuel Grenier (ICOLD Media Manager),				OBSERVERS : T Sakamoto (Japan), K Jansson (Canada), L Spragens (USA)	

**Introduction:**

The Committee on Public Awareness and Education met from 830 to 1400 hours on Tuesday 11 June 2019 during the ICOLD Meeting in Ottawa, Canada. The meeting was attended by 6 members, 3 substitutes and 3 observers.

**Summary:**

The following is a summary of the meeting:

After a review of membership and last year's minutes a discussion was held on the Terms of Reference for the period 2018 to 2021. The wording and intent of the Terms of Reference was discussed and it was agreed to record the outcome of these discussions. This record provides a guide to new members and direction for future tasks proposed by the Committee. In addition it was agreed that some of the roles identified in the current Terms of Reference while relevant in the past, have less relevance today and require review.

The ICOLD Media Manager Emmanuel Grenier gave an update on Media activities of the Central Office over the past year. Central Office has monitored response to the incidents around the world especially those involving tailings dam failures.

Updates were provided by the Japanese, Chinese, Brazilian, Czech, New Zealand and USD representatives on their National Committee initiatives in the area of public awareness and education.

The Japanese Committee has been very active in the area of public awareness with the concept of dam tourism being very successful, especially in relation to the construction of the new Yamba Dam. They have also produced cards for 100 dams with basic information and photos and a publication as a guide books for dam tourists. Japan has recently experienced significant floods which has tested flood management infrastructure including the capacity of the dams to enable flood control. Committee members highlighted that the public in general have short memories when it comes to the historical effects of large flood events a. Despite many good flood defence systems being in place the task of communicating risks in this area is ongoing.

CHINCOLD is also very active in the area of public awareness with a defined program highlighting the wider role of dams and associated reservoirs. Areas of emphasis include improving public awareness amongst the younger generation and throughout the whole dam life cycle.

Despite the good publicity created by the ICOLD meeting in Prague in 2017 and the droughts of 2014, CZCOLD the attempts to gain a balanced view of issues relating to dams in the Czech media is still challenging. The risks associated with lack of water storage still remains in the Czech Republic. CZCOLD has employed a consultant to assist with public awareness of these issues and produce a Communications Strategy.

USD have formed a committee to manage advocacy, communication and public awareness and have been active in forming a series of position statements in areas such as the investigation of the incidents relating to dams and levees, responsibility for dam safety, dam decommissioning and

securing future water supplies.. NZSOLD is still liaising with central government on the progressing of dam safety legislation and in the interim have successfully updated their Dam Safety Guidelines to assist the dam industry.

The proposal for the production of a video based on the ICOLD “Dams and the Worlds Water” has progressed through the efforts of the Brazilian National Committee. The Brazilian Committee along with a comprehensive public awareness program have produced a video based on the ICOLD publication “Dams and the Worlds Water”. This video has been produced in Portuguese and English. While the video is currently focussed on Brazilian Dams there is scope to replicate and edit the video to suit other regional or national contexts.

The draft update to the 1999 ICOLD publication “Benefits and Concerns About Dams” was discussed with completion of this project expected later this year. Issues regarding the updating of data and review of the work of other ICOLD Committees have delayed this project.

Further discussions were held on the idea of a workshop providing an opportunity for National Committees and members to engage with the issues facing the world dam community and strategies that could be successfully used to manage them. Consideration was given to the idea of a small bulletin including a series of case studies highlighting successful implementation of public communication relating to dam projects. The committee will investigate opportunities to present theses case studies either through a workshop or a session associated with an ICOLD symposium.

Discussions were held on the current issues relating to tailings dams and the role of ICOLD. As in the past with water impounding dams, it was considered that ICOLD did have a role in providing guidelines for both good technical practice and governance.

O) WORLD REGISTER OF DAMS AND DOCUMENTATION				O) REGISTRE MONDIAL DES BARRAGES ET DE LA DOCUMENTATION	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in Vienna 11 <sup>th</sup> June 2019				Réunion à OTTAWA 11 Juin 2019	
MEMBERSHIP / LISTE DES MEMBRES				MEMBERSHIP / LISTE DES MEMBRES	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
France	LE DELLIOU	Patrick	Chairman	P	
Austria	CZERNY	Helmut	Member		A
Brazil	FUNCHAL DE FARIA	Etore	Member	P	
Canada	FERLAND	Martin	Member	P	
China	ZHENG	Cuiying	Member		A
Czech Rep	SATRAPA	Ladislav	Member	P	
Greece	PAPACHATZAKI	Z-Rea	Member		A
India	KANJLIA	Vijay	Member	P	
Iran	SAYYARI	Majid	Member		A
Japan	KASHIWAYANAGI	Mazayuki	Member	P	
Norway	LINDLAND	Dag	Member		S : Aslak Bøhle Foss
Portugal	ROCHA AFONSO	Jose	Member	P	
Russia	X		Member		
Slovenia	HUMAR	Nina	Member		A
South Africa	ROCHECOUSTE COLLET	Bertrand	Member		A
Spain	HIJOS	Francisco	Member		A
Korea	KIM	Sung Han	Member		A
United Kingdom	PEPPER	Andrew	Member		A
USA	RAGON	Rebecca	Member		A
Observers : Lazaridou Serafeina (Greece)					

<p><b>0/ Preamble</b> Committee O deals with two main topics:</p> <ul style="list-style-type: none"> <li>• the world register on dams,</li> <li>• the documentation in particular with a sub-committee in charge of a formal review of the draft technical bulletins submitted to the approval of the General Assembly (five bulletins examined this year).</li> </ul> <p>This progress report concerns only the register.</p> <p><b>1/ Approval of the Agenda</b> The proposed agenda is adopted.</p> <p><b>2/ Membership</b> Committee O is one of the committees which have many official members. The general assembly in Vienna has approved the nomination of Mr Kim for South Korea, Mr Pepper for United Kingdom and Mr Chernyshenko for Russia. Halas, Mr Chernyshenko is no longer member of RUSCOLD. Norihisa Matsumoto is retired and replaced by Mr Kashiwayanagi.</p> <p>SPANCOLD has designed Mr. Hijos as member of committee O but the list of countries he is in charge of is still under discussion.</p> <p>The updated list will be of course sent to all the members.</p> <p><b>3/ Data collection</b> 99% of the dams are situated in countries that are members of ICOLD. The role of each committee member is to give the register for the country he/she comes from but also to contact each national committee he/she is responsible for, at least once a year, in order to</p>	<p><b>0 / Préambule</b> Le comité O est en charge de deux thèmes principaux :</p> <ul style="list-style-type: none"> <li>• le registre mondial des barrages,</li> <li>• la documentation, en particulier, avec un sous-comité en charge de l'examen formel des projets de bulletins techniques soumis à l'approbation de l'Assemblée Générale (cinq bulletins examinés cette année)</li> </ul> <p>Ce rapport concerne seulement le registre.</p> <p><b>1/ Approbation de l'ordre du jour</b> L'ordre du jour proposé est adopté sans modification</p> <p><b>2 / Composition du comité</b> Le comité O est l'un des comités qui ont un grand nombre de membres officiels. L'assemblée générale de Vienne devrait approuver la nomination de M. Kim pour la Corée du Sud , de Mr Pepper pour le Royaume Uni et de Mr Chernyshenko pour la Russie. Cela pourra rendre possible des modifications ultérieures de la répartition des pays entre les membres.</p> <p>SPANCOLD a désigné M. Hijos comme membre du comité O mais la liste des pays dont il est chargé est toujours en cours de discussion.</p> <p>La liste actualisée sera naturellement transmise à l'ensemble des membres.</p> <p><b>3/ Collecte des données</b> 99% des barrages sont situés dans des pays membres de la CIGB. Le rôle de chaque membre du comité est d'abord de fournir le registre du pays dont il/elle provient, mais aussi de contacter, au minimum une fois par an, chaque comité national dont il/elle a la</p>
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<p>have updated information. In fact, it is very frequent that national committees do not answer. Another way is to find the information (press, internet, universities...), to include this information in the concerned national register and to sent this file to national committees for approval. One way is also to compare the register of ICOLD to other databases (for examples FAO/AQUASTAT of United Nations, GranD. The chairman will send to each committee members these databases.</p> <p>There are also links to create and maintain with the World Bank that is working on this topic</p> <p>Several countries have recently sent a new version. The final file will be sent to central office in a couple of weeks.</p> <p>Tailings dams are now officially included in the register but it will be probably a long process.</p> <p><b>4/ Surveys on the register</b> Two surveys are proposed :</p> <ul style="list-style-type: none"> <li>• for final users of the register (how to interact or propose modifications, errors, new fields?...</li> <li>• for national committees in order to have their position on general questions concerning the register.</li> </ul> <p>Each member must fill free to send proposals to the chairman for this two surveys</p> <p><b>5/ Technical notes</b> 3 short notes have been prepared (on the elevation of the dam, international dams and on hydropower) in order to precise the corresponding fields.</p>	<p>charge afin d'obtenir une information actualisée. Une autre façon de procéder est d'obtenir cette information (presse, internet, universités...), d'inclure ces données dans le registre national concerné et de transmettre cette version au comité national pour approbation. Une autre façon est de comparer le registre CIGB à d'autres bases de données (par exemple FAO/AQUASTAT des nations unies, GranD). Le président transmettra à chaque membre du comité O ces bases de données.</p> <p>Il y a des liens à créer avec la Banque Mondial qui travaille également sur cette thématique.</p> <p>Plusieurs pays ont récemment transmis des versions à jour de leur registre. La version consolidée sera transmise au Secrétariat Général dans quelques semaines.</p> <p>Les barrages de stériles sont désormais officiellement partie du registre mais leur intégration sera sûrement longue.</p> <p><b>4/ Enquêtes sur le registre</b> Deux enquêtes sont envisagées :</p> <ul style="list-style-type: none"> <li>• Pour les utilisateurs finaux (comment faire remonter des remarques, quels nouveaux champs, erreurs...)</li> <li>• Pour les comités nationaux pour avoir leur opinion sur des questions générales concernant le registre.</li> </ul> <p>Chaque membre fera remonter ses propositions éventuelles au président.</p> <p><b>5/ Notes techniques</b> 3 notes brèves ont été préparées (sur l'altitude, les barrages internationaux, l'hydroélectricité) ont été préparées afin de préciser certains champs.</p>
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**6/ Proposals to the Board of ICOLD**

The chairman comments a document sent to the Board and Secretary General explaining:

- The situation of the register
- Why we are sure that it is the best database compare to other databases
- The possibility already existing of the georeferencing of the WRD.

The decisions are not yet finalized.

**7/ Axes of progress of the year 2019-2020**

The committee has defined three axes of progress for this period with a measure of the each axes in order to have not only a larger register but, more important, a better register :

- axe 1: include all the large dams in operation or under construction in all the countries
- axe 2: for each dam, include all the possible data. All the fields do not have the same importance and the committee have defined a quality index taking into account different weights for each field.
- axe 3: verify that the values are good or not so wrong, abnormal... The committee have some tools to make correlations between fields to verify this, especially wrong use of units.

**8/ WRD & documentation of ICOLD**

The name of Committee O includes these two topics. For the second point, a sub-committee made a formal review of 6 draft bulletins to be approved in Ottawa.

Concerning the documentation and in order to demonstrate why the register is very important for all dam engineers, the chairman has prepared a database with all the communications in the congresses

**6/ Propositions au Bureau de la CIGB**

Le président commente un document transmis au Bureau et au Secrétaire Général exposant :

- L'avancement du registre ;
- Pourquoi on est certain que le registre CIGB est meilleur que d'autres bases de données ;
- La possibilité déjà existante d'un géoréférencement du registre mondial de la CIGB.

Les décisions ne sont pas encore finalisées.

**7/ Axes de progrès pour 2019-2020**

Le comité a défini trois axes de progrès pour cette période avec une mesure sur chacun des axes afin d'obtenir un registre non seulement complet mais surtout de meilleure qualité :

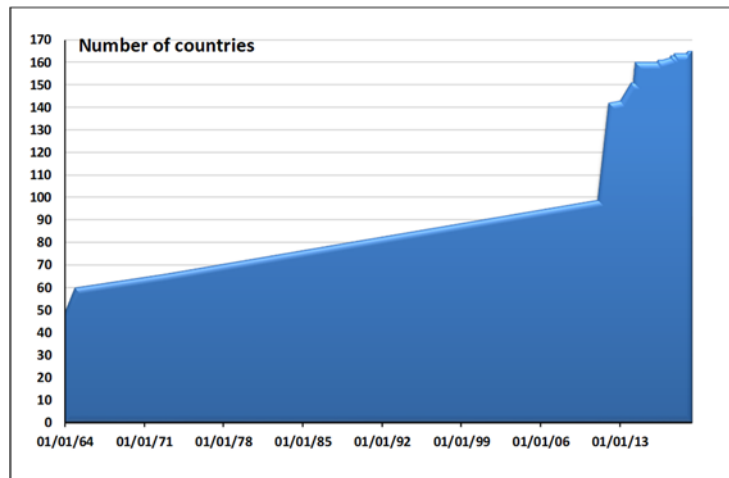
- axe 1 : inclure tous les grands barrages en construction ou en service pour tous les pays ;
- axe 2 : pour chaque barrage, inclure toutes les données possibles. Tous les champs n'ont pas la même importance et le comité a défini un index de qualité prenant en compte différentes pondérations pour chaque champs ;
- axe 3 : vérifier que les valeurs sont bonnes ou pas trop fausses, anormales... Le comité a développé des outils pour établir des corrélations entre des champs pour vérifier ce points, notamment pour éviter un usage erroné des unités.

**8/ Registre & documentation de la CIGB**

Le nom du comité O comprends ces deux thèmes. Pour le deuxième point, un sous-comité a réalisé une revue formelle de 6 projets de bulletins à approuver à Ottawa.

Concernant la documentation et afin de démontrer l'importance du registre pour tous les ingénieurs « barrages », le président a constitué une base de données comprenant les références des

of ICOLD from the very beginning (1933) to Vienna 2018 + the symposiums and workshops from Beijing 2000 to Vienna 2018 (soon Ottawa 2019). This represent more than 8600 entries. The work under process is to create all the possible links between the register of dams and this database in spite of errors, misspelling, aliases... of the name of the dams. The present point is that we have found links for more than 3600 dams. This will be shown during the General Assembly. The chairman will send the Excel tool to each committee member.



communications de l'ensemble des congrès de la CIGB depuis le début (1933) jusqu'à Vienne 2018) + les symposiums et ateliers de Pékin 2000 à Vienne 2018 (bientôt Ottawa 2019). Ceci représente plus de 8600 entrées. Le travail en cours est de créer tous les liens possible entre le registre des barrages et cette base de données en dépit des alias, des errors d'orthographe... pour le nom des barrages. A ce jour, les liens ont été établis pour plus de 3600 barrages. Cette question sera exposée lors de l'assemblée générale. Le président transmettra l'outil Excel correspondant à chaque membre du comité.





**Biblio ICOLD**

Nom du barrage : HOOVER

Pays : Etats-Unis/United States of America

Code : I18702333

Type : XX/PG/VA

H (m) : 223

Capacité (1000 m3) : 35200000

STOCKHOLM (1948)	DETERMINATION OF STRESS FROM MEASUREMENTS IN CONCRETE DAMS   Raphael J.M.
STOCKHOLM (1948)	A PROGRAM OF CEMENT RESEARCH OF SIGNIFICANCE TO BUILDERS OF LARGE DAMS   Tyler I.L.
NEW DELHI (1951)	THE PROPERTIES OF MASS CONCRETE MADE WITH COMBINATIONS OF PORTLAND POZZOLAN-CEMENT, AS USED BY THE BUREAU OF RECLAMATION
PARIS (1955)	DEVELOPMENT OF HIGH QUALITY CONCRETE OF LOW CEMENT CONTENT FOR LARGE DAMS BUILT BY THE BUREAU OF RECLAMATION
NEW YORK (1958)	OBSERVED STRUCTURAL PERFORMANCE OF LARGE CONCRETE DAMS OF THE BUREAU OF RECLAMATION   Simonds A.W., Richardson
LAUSANNE (1985)	CRACKING IN CONCRETE DAMS. USBR CASE HISTORIES   Boggs H.L.
BRASILIA (2009)	SEISMIC SAFETY EVALUATION AND UPGRADING OF ARCH DAMS   Chopra A.K., Nuss L.K.
KYOTO (2012)	EARTHQUAKE RESPONSE ANALYSIS PROCEDURES FOR EVALUATING AND UPGRADING EXISTING ARCH DAMS FOR SEISMIC SAFETY
VIENNA (2018)	DYNAMIC ANALYSIS PROCEDURES FOR SEISMIC RISK ANALYSIS OF CONCRETE DAMS   Anil K. CHOPRA

**Data from the World Register on Dams**

**Data from the Documentation Database**

**COMMITTEE ON CEMENTED MATERIAL DAMS**  
**PROGRESS REPORT**  
 Meeting in Ottawa, 11<sup>th</sup> June 2019

**COMITE DES BARRAGES EN REMBLAI CIMENTE**  
**RAPPORT D'ACTIVITÉ**  
 Réunion à Ottawa, 11<sup>th</sup> June 2019

MEMBERSHIP / LISTE DES MEMBRES

COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
China	JIA	J.	Chairman	P	
France	LINO	M.	Vice-C.	P	
Austria	PICHLER	W.	Member		A
Turkey	YILDIZ	E.	Member		A
South Africa	CAMERON-ELLIS	D.	Member	P	
USA	ARNOLD	T.	Member	P	
Japan	YOSHIDA	H.	Member		Yoshikazu Yamaguchi
Spain	ORTEGA	F.	Member	P	
UK	MASON	P.	Member	P	
South Korea	LEE	W.	Member		A
Iran	NOORZAD	A.	Member	P	
Portugal	CAMELO	A.	Member		A
Russia	YURIEV	S.	Member		A
Italy	SCARELLA	M.	Member	P	
Switzerland	GOLTZ	M.	Member	P	
Sri Lanka	Wickramasooriya	M.	Member		A
China	JIN	F.	Co-opted	P	
China	ZHENG	C.	Co-opted	P	
France	PUIATTI	D.	Co-opted	P	
France	DELORME	F.	Co-opted	P	
Russia	MIKHAILOV	M.	Co-opted		A
				OBSERVERS : Richard Guimond (Germany/Switzerland/Canada), Tay Guan Heng (Malaysia),	

## 1 Membership

**Member countries:** China, France, Italy, Iran, Japan, South Africa, Spain, Switzerland, UK, USA. 10 countries members and 4 co-opted members present in Ottawa.

SLCOLD recommended new member, M.D.J.P. Wickramasooriya. New members from Russia, Public of Korea, Egypt and Sri Lanka didn't attend this years meeting.

Austrian member did not participate the last meetings (Bali, Stavanger, Johannesburg, Prague and Vienna). In accordance with the orientations of the Board of ICOLD, a letter will be addressed to the national committee to propose the replacement of their representative.

## 2 Agenda of the TC meeting

Part 1: Administrative part, including memorizing Mr. Nikos Moutafis, new committee members, review of the last TC meeting in Vienne in 2018 and activities thereafter, etc.

Part 2: Technical part, including presentations and discussion on bulletins under preparations

## 3 Technical discussions

### Discussion of the RFC bulletin

- Introduction of Major revision of the Bulletin since last TC meeting in Vienna by Dr. JIN Feng (China)
- Discussion of the bulletin. According to discussion,
  - The TC will publish bulletins on RFC, CSD and CSGR/CSG/Hardfill etc. Cemented Material Dam is suggested to be included in the title of each Bulletin. As for RFC bulletin, the title could be:
    - Cemented Material Dam: Design and Practice
    - Rock-Filled Concrete Dam
  - Keep contents of PAC in introduction section and references, and delete section 8.2.
  - M. Lino will prepare section 8.4.
  - J. Jia will prepare material of waterstop.
  - AAR shall be considered and evaluated whether it is necessary to carry out further studies.

### Time schedule as following:

Before end of this July:

- Everyone will send his comments and suggestions to F.Jin.
- A.Camelo will send his contribution on PAC of Chapter 8.2 to Feng. Otherwise, this Chapter will be removed.
- M.Lino will send his contribution on Rockfill percolated with concrete of Chapter 8.4 to F.Jin. Otherwise, this Chapter will be removed.
- C.Zheng will send her contribution on waterstop to F.Jin.

Before end of this August:

- M.Lino will finalize the chapter 0 general introduction.
- F.Jin will complete revision of the draft and send to T.Arnold.
- Before end of this September:
  - T.Arnold will lead the checking expert group to check the draft and send to F.Delorme.
  - T. Arnold, P. Mason and D. Cameron-Ellis are responsible for English wording
- Before end of this November:

- F.Delorme will supervise the French translation.
- J. Jia and M. Lino will check the content
- M.Lino will send the final version to the Central Office of ICOLD. It must be sure the draft will be submitted three month before Assembly meeting in New Delhi for approval.

### **Discussion of Cemented Soil Dams bulletin**

- Introduction of progress of the CSD bulletin by D.Puiatti and M. Lino (France)
  - Discussion of the bulletin.
  - A complete draft of the bulletin was sent to the TC members two months before the meeting (without appendices). This first draft has been reviewed in detail by F.ORTEGA and SPANCOLD. The comments were discussed during the session.
  - There is a general agreement in favor of the proposed design for dam under 30 m.
  - H. Yoshida questioned the necessity of sophisticated analysis (FEM or FDM, CamClay model...) for small structures: these analyses are pertinent in the development phase of the new concept of CSD.
  - The economy of the CSD compared to classical solutions was discussed.
  - The design of the upstream facing and drainage was discussed. Geomembrane upstream facing is judged to be a good option. M. Scarella will provide a description of possible design and construction of a geomembrane facing and related drainage system (contribution in chapters 2 and 5).
  - J.Jia presented the case of Wuyi dikes in China where the improvement of the liquefiable foundation of the dyke is realized by replacement of silty material in the foundation by cement treated soil. J.Jia will provide a contribution on this case.
  - J.Jia says that the case where this new technique is recommended should be better clarified. The resistance to overtopping should be more documented.
  - Mixing equipments were discussed. Recommended equipments should be better describe (no drum mixer).
  - J.Jia will give a contact with a Chinese expert in soil treatment.
  - T.Arnold will investigate if there are other references of treated soil for hydraulic works in the USA.
- Schedule for bulletin preparation
  - Contribution by M. Scarella (upstream facing), J.Jia (Wuyi dike), T.Arnold and other TC members: end of September
  - Final draft for the TC member : end of January
  - Final discussion in Ottawa
  - Objective: getting approval of the bulletin in Marseille.

### **Discussion of the Hardfill/CSG/CSGR bulletin**

The content of the bulletin was not discussed during the TC meeting .

The name of the technique was discussed: Hardfill, CSG, CSGR? M.Lino and others propose to keep Hardfill as a generic name because it is already used in the ICOLD publications (bulletin 117, bulletin 175 etc..). CSG, CSGR would be used to describe national application. Discussion to be continued.

The following organization was decided for drafting the bulletin

- |                               |                                     |
|-------------------------------|-------------------------------------|
| - Chapter 0 : Introduction    | J.Jia/M.Lino                        |
| - Chapter 1 : Background      | F.Delorme                           |
| - Chapter 2: Design           | F.Delorme/P.Mason/D.CameronEllis    |
| - Chapter 3 : Raw material    | M.Lino/A.Noorzad                    |
| - Chapter 4 : Mix design      | T. Arnold                           |
| - Chapter 5 : Construction    | D. Cameron-Ellis/F.Ortega/F.Delorme |
| - Chapter 6 : Quality Control | P. Mason                            |

- Chapter 7 Monitoring & performance                      F.Ortega
- Schedule for bulletin preparation
- Draft of the chapters :    end of January
- Objective:    getting approval of the bulletin in Teheran?

#### **Other issues discussed**

- The 8<sup>th</sup> Symposium on RCC Dams (Nov 11-12 2019, Kunming, China): Bulletins discussion during the symposium and CMD project visit (2 days pre study tour in Guizhou province, one RFC dam and one CSGR dam under construction)
- Preparation of next meeting: Discussion in Delhi, India - April 2020
- Expected interaction between Committee P and Committee LE on Levees. This point has been discussed during the committee LE workshop on Monday 10/06 on Dam-levees comparison.
- Communication and discussion with Concrete committee has been arranged. J. JIA and F. Ortega joined the discussion of RCC international symposium to be organized on Nov. 11-12 this year in KUNMING, China. It will be a good opportunity to share information between RCC and CMD.

Jinsheng JIA, Michel LINO  
 Chairman and Vice Chairman, ICOLD Committee on Cemented Material Dams  
 June, 11, 2019

**Q) DAM SURVEILLANCE**  
PROGRESS REPORT  
Meeting in Ottawa, 11 June 2019

**Q) SURVEILLANCE DES BARRAGES**  
RAPPORT D'ACTIVITÉ  
Réunion à Ottawa, le 11 juin 2019

MEMBERSHIP /LISTE DES MEMBRES		MEETING / Réunion	
COUNTRIES / PAYS	MEMBERS / MEMBRES	Present	Absent/Substitutes
South Africa	L HATTINGH (Chairman)	P	-
Spain	M. GOMEZ DE MEMBRILLERA (Vice Chairman)	P	-
Argentina	A. PUJOL	P	-
Australia	A. REYNOLDS	P	-
Canada	P. CHOQUET	P	-
Czech Rep.	P. KRIVKA	P	-
China	Z. LU	P	-
Egypt	A. EL-ASHAAL	P (part time)	-
Ethiopia	M. ABEBE	-	A
France	T. GUILLOTEAU	P	-
Germany	M. AUFLEGER	P	-
Iran	A. NORZAAD	P (part time)	-
Italy	A. MASERA	-	A
Japan	J. TAKANO	P	-
Korea	D. CHOI	-	A
Mozambique	I. TEMBE	-	A
Norway	G. GRZANIC	P	-
Portugal	C. PINA	P	-
Romania	I. ASMAN	P	-
Russia	E. FILIPPOVA	-	A
Slovenia	P. ŽVANUT	P	-
Spain	J. FLEITZ	P	-
Sudan	H. OMER	-	A
Sweden	S. JOHANSSON	P	-
Switzerland	L. MOUVET	P	-
UK	I. HOPE	P	-
USA	A. SUTTER	P	-
Corresponding or co-opted Members			
Colombia	A. DUQUE	-	A
France	A. SIMON	P	-
Norway	Ø. LIER	-	A
Portugal	J. CUNHA	P	-
Portugal	J. MATA	-	A
Switzerland	M. COTE	P	-
OBSERVERS: B. ROCHFORD (USA), R. SAAVEDA (USA), B. MATSINHE (Mozambique), J. ALGORTA (Uruguay), J. SAEIDI (Canada), R. BEGUIN (France), L. BURMEISTER (Canada), T. OSWELL (Canada), J. SAUNDERS (Canada), N. MACDONALD (Canada), J. GIENOW (Canada), G. SOUSA MELO (Brazil), A.C. WILLIAM (Malaysia), F. BUJUM (Malaysia), M. LUTHER (Canada), W. FREDERICK (Uganda), P. ACHECAMPONG (Ghana), A.B OSAFO-KISSI (Ghana), L. WILBUR (Canada), F. HADDAD (Canada), G MOLINDER (Sweden), P. LUNDQUIST (Sweden), A. HOBBS (Canada), J. HISCOCK (Canada), K. OTIM (Uganda), E. SAITO (Japan), N. WONGVATANA (Thailand), M. SMITH (Canada)			

## **Q) DAM SURVEILLANCE**

### **PROGRESS REPORT**

Meeting in Ottawa, 11 June 2019

The Terms of Reference (ToR) of the new Technical Committee on Dam Surveillance (TCDS) were approved at the Annual Meeting in Kyoto 2012 for the term 2013-2016. An informal meeting of our previous TCDS members was held in Kyoto on 4 June 2012. It was decided to start off with a bulletin on dam surveillance case histories (Bulletin 180). In Prague the term was extended until 2021.

Our seventh meeting was held in Ottawa on 11 June 2019. It was attended by 21 out of the 27 members, 3 co-opted members and 28 part-time observers. None of the absent members apologized except for Ethiopia and Sudan. We had a Workshop on “Bulletin 2”, titled “Acquisition and interpretation of surveillance data and observations”, on 10 June 2019 to introduce the bulletin to the general ICOLD audience. 107 people attended the Workshop and valuable comments were received, and they will be taken into account during the compilation of the bulletin.

At the meeting of 11 June 2019, we had detail discussions on the contents of the aforementioned “Bulletin 2”, covering the main aspects of the terms of reference for the bulletin and including the comments received at the Workshop held on 10 June 2019:

- Methods for the improvement of the quality and reliability of data/information
- Data processing and representation techniques
- Effective diagnostic analyses to determine behavior patterns

The committee is well on its way to finish the bulletin by the end of the current term 2021. We had discussions, contributions and presentations on detail aspects of each chapter including relevant practices in some member countries and discussions on the way forward.

## **Q) SURVEILLANCE DES BARRAGES**

### **RAPPORT D'ACTIVITÉ**

Réunion à Ottawa, le 11 juin 2019

Les termes de référence (TdR) du nouveau Comité technique sur la Surveillance des barrages (TCDS) ont été approuvés à la réunion annuelle de Kyoto en 2012, pour la période 2013-2016. Une réunion informelle des anciens membres TCDS a eu lieu à Kyoto le 4 juin 2012, au cours de laquelle il a été décidé de commencer avec un bulletin s'appuyant sur des événements vécus en lien avec la surveillance des barrages (Bulletin 180). Une prolongation jusqu'en 2021 fût actée à Prague.

Notre septième réunion s'est tenue à Ottawa le 11 juin 2019. Elle a réuni 21 participants sur un total de 27 membres, 3 membres cooptés et 28 observateurs à temps partiel. Aucun des membres absents ne s'est excusé, à l'exception de l'Éthiopie et du Soudan. Le 10 juin 2019, nous avons organisé un atelier de présentation du «Bulletin 2», intitulé «Acquisition et interprétation des données et des observations de surveillance», ouvert à tous les participants de ICOLD. 107 personnes ont assisté à l'atelier et nous avons reçu des commentaires précieux, qui seront pris en compte lors de la réalisation du bulletin.

Lors de la réunion du 11 juin 2019, nous avons eu des discussions détaillées sur le contenu du «Bulletin 2» susmentionné, couvrant les principaux aspects des termes de référence du bulletin et intégrant les commentaires reçus lors de l'atelier du 10 juin 2019:

- Méthodes pour l'amélioration de la qualité et la fiabilité des données/informations
- Traitement des données et techniques de représentation
- Méthodes d'analyses pour caractériser les comportements

Le Comité est bien engagé pour finir le bulletin à la fin de son mandat en 2021. Nous avons eu des discussions, des contributions et des présentations détaillées sur le contenu de chaque chapitre, y compris les pratiques pertinentes dans certains pays membres et des discussions sur la marche à suivre.

During our meeting, we also had the privilege of having over members from other ICOLD Technical Committees. On the one hand, we will contribute to the formulation of the Benchmark Workshop that Committee A is planning to hold in 2021, and on the other, we will develop a new bulletin on the surveillance of spillways along with Committee C.

Au cours de notre réunion, nous avons également eu le privilège d’accueillir les membres d'autres comités techniques de la CIGB. D'une part, nous contribuerons à la formulation de l'atelier de « benchmark » que le Comité A prévoit d'organiser en 2021 et, d'autre part, nous élaborerons un nouveau bulletin sur la surveillance des évacuateurs de crues avec le Comité C.

RE) RESETTLEMENT DUE TO RESERVOIRS				
PROGRESS REPORT				
Meeting in Canada, June 11, 2019				
MEMBERSHIP / LISTE DES MEMBRES				
COUNTRIES/PAYS	MEMBERS/MEMBRES		Present	Absent/Substitutes
China	Wang Xijiong	Chairman	Yes	
Brazil	Anderson Braga Mendes	Member		Dimilson Pinto Coelho
Colombia	Andrés Amaya	Member	Yes	
Germany	Bettina Geisseler	Member		Absent
Iran	Masoud Hakami	Member		Absent
Indonesia	Airlangga Mardjono	Member		Absent
Japan	Koji Tabata	Member	Yes	
Korea	Han Joong	Member		Absent
Mexico	Humberto Marengo Mogollon	Member		Absent
Pakistan	Shahid Hamid	Member		Absent
Pakistan	Khawar Munir	Co-opted Member		Absent
Nigeria	Stella Arachie	Member	Yes	
Britain	Alison Bartle	Member	Yes	
China	Shi Guoqing	Co-opted Member	Yes	
OBSERVERS: Wang Kui, Liu Chunping, Jian Hu, Shingo Satomura, Ankur Agarwal, Carlos Bonete Martinao, Siraj Abdullahi, Zhang Guoping, Tu Wenhua, Shang Yanguang, Bin Lishu				

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## AGENDA OF THE TECHNICAL COMMITTEE ON RESETTLEMENT DUE TO RESERVOIRS

On June 11, 2019, Committee on resettlement due to reservoirs meeting included the following agenda items:

- Case Studies and discussion Host: Shi Guoqing
  1. Reservoir Resettlement in China Presented by Mr. Liu Chunping
  2. Experience of Resettlement Action Plan Upper Kotmale Hydropower Project in Sri Lanka Presented by Mr. Koji Tabata
  3. Resettlement in Colombia: Evolution by adaptation Presented by Mr. Andrés Amaya
  4. Xiaolangdi Dam Project Case Study -Resettlement Risks and Management Presented by Mr. Shi Guoqing
  5. Q&A regarding to above presentations
- Committee Meeting Host: Wang Xijiong
  1. Committee work report 2019
  2. Discussion: a. Work plan of Committee RE  
b. Technical bulletin of Committee RE

## MINUTES OF THE MEETING

First of all, Chairman Wang Xijiong showed his warmly welcome to members and observers who attended Committee RE's annual meeting and give a brief introduction to all attendees.

As the first part of this meeting, Mr. Shi Guoqing hosted an interesting and active case studies and discussion. On behalf of Mr. Wang Kui who is the chief engineer of China Renewable Energy Engineering Institute with more than 20 years experience in resettlement due to reservoir, Mr. Liu Chunping shared general situation, regulations and policies and case of reservoir resettlement in China. Mr. Koji Tabata from JPower presented his experience of resettlement action plan upper kotmale hydropower project in Sir Lanka. Mr. Andrés Amaya gave an presentation on the aspect of evolution by adaptation basing on case study of resettlement in Colombia. And Mr. Shi Guoqing talked something about resettlement risks and management and case study of Xiaolangdi Dam project. Regarding to these four presentations, there was a heated discussion. Questions such as how to reach a compromised agreement between dam supporters and opponents/ project owner and stakeholders, how to carry out research of stakeholders' willing as China has a very high population density and how to ensure that stakeholders' willing are understood and handled properly, how to dealing with different policies and regulations in different countries, how to push forward project within countries in conflict were raised. Attendees shared their opinions about these questions on aspects of working mechanism of pre-planing survey, door to door investigation, meeting with stakeholders etc held by local government, project owner and third party. Special organization such as resettlement bureau to deal with requests and feedback from stakeholders according to existing policies and regulations. Attendees agree that it is an effective way to solve problems by having stakeholders to be involved as a decision maker and with an idea to benefit everybody.

At the second part, Mr. Shang Yanguang gave a work report of Committee RE. He briefed Committee history, events and updated member list. Since last meeting, China workteam has attached great importance to case studies and invited top and experienced experts to work on it. Now, a case study report of resettlement due to reservoirs in China is nearly done, and its English version will be published soon. Meanwhile, Committee RE has built a website ,<https://www.ctg.com.cn/icold/index/>, it has been put into test run right now. Then, Mr. Wang Xijiong exchanged ideas of the website, how to work together to carry out committee bulletin on time and how to invite professionals from more dam countries to join the committee with members. For website, members suggested to add items such as survey, events, links of policy and regulations of different countries, upload and download of case studies. About the bulletin, members suggested to clear an outline of it and also members will see what they can do to enrich its content. In addition, members needs to do their best to introduce and invite professionals from more dam countries to join Committee RE. Members reached a common understanding that it is hard to have an international standard of resettlement as it is influenced by culture, ethic, history, and other social factors of different countries. To share case studies of different countries is an effective way to help us to know each other. Chairman Wang Xijiong asked members to send their suggestion on case studies and feedback regarding to framework of bulletin as soon as possible. At the same time, committee office will improve the website accordingly and welcome members to share information on the website, and outline of case study report of resettlement due to reservoirs in China can be taken as a reference and it will be shared with all members once it is available. Then, the outline of case study should be finalized and job tasks should be assigned to members by the end of 2019. The target is that draft of the Bulletin can be finished and discussed on

committee meeting Feb. 2020.

Later, Mr. Shi Guoqing introduced the second International Conference and Study Tours on The Futures of Displacement and Resettlement which will be held in China from Aug.31 to Sept. 3. A pre-conference study tours either three gorges project study tour or Nanjing city tour.

After the meeting, we will brief all members the activities of what we have done. The secretariat will organize the minutes of the meeting and then report to ICOLD general office as well as our committee members. For the good suggestions regarding to work plan and bulletin preparation proposed during our discussion will be accepted in the revision of work plan.

<b>S) FLOOD EVALUATION &amp; DAM SAFETY - ESTIMATION DE CRUES &amp; SÉCURITÉ DES BARRAGES</b>					
<b>PROGRESS REPORT - RAPPORT D'ACTIVITÉS</b>					
Annual Meeting / Rencontre annuelle – Ottawa (Canada), 2019/06/11					
Room S-206 (Shaw Centre)					
MEMBERSHIP / LISTE DES MEMBRES				MEETING / RENCONTRE	
COUNTRIES / PAYS	MEMBERS / MEMBRES			Present	Absent/Substitute/Apologies
Canada	TREMBLAY	M.	Chairman	Yes	
Switzerland	JOOS	B.	Vice-Chairman	Yes	
Australia	HILL	P.	Member	Yes	
China	HUANG	Y.	Member	Yes	
Czech Republic	KUCERA	C	Member	Yes	
Dominican Republic	ARMENTEROS RIUS	J.	Member	Yes	
France	PAQUET	E.	Member	Yes	
Germany	MÜLLER	U.	Member	Yes	
Iran	NOURY	M.	Member	Yes	
Ireland	O'MAHONY	B.	Member	Yes	
Japan	ORUKAWA	G.	Member	Yes	
Korea (South)	JUN	K.S.	Member	Yes	
Mexico	MARENGO	H.	Member	Yes	
Netherlands	BAS	K.	Member	Yes	
Sweden	SODERSTROM	A.	Member	Yes	
UK	WARREN	A.	Member	Yes	
USA	NG	Kit	Member	Yes	
Canada	MICOVIC	Z.	Co-opt member	Partial	
Canada	GAUTAM	N.	Co-opt member	Yes	
Japan	KASHIWAYANAGI	M.	Co-opt member	Partial	
Spain	BERGA	L.	Co-opt member	Partial	
Brazil	ZNAMENSHY	D.	Member		Absent

Italy	BONAFE	A.	Member		Absent
Netherlands	VAN DUIVENDIJK	J.H.	Co-opt member		Absent
Pakistan	SHAIKH	I.B.	Member		Absent
Poland	ZALESKI	J.	Member		Absent
Romania	GABOR	O.	Member		Absent
Russia	GUGUSHVILI	I.	Member		Absent
South Africa	SMITHERS	J.	Member		Apologies
Turkey	DALKIR	O.	Member		Absent
Ukraine	VOLOSHINA	N.	Member		Absent

AGENDA OF THE TECHNICAL COMMITTEE S

On June 11<sup>th</sup>, 2019, Committee S meeting included the following agenda items:

- Welcome and introduction
  - Approval of the Minutes of the previous meeting held in Vienna (Austria) on July 1<sup>st</sup>, 2018.
- Activities of the committee since the previous meeting
- National Floods Management activities in 2018-2019 – presentations by the committee members
- Discussion on the 2015-2020 bulletin on “Flood Evaluation, Hazard Determination and Risk Management”
- Discussion on the 2019-2022 bulletin
- Program of Activities for 2019-20
- Varia

ITEM	DISCUSSIONS
1	<p><b>WELCOME AND INTRODUCTION</b></p> <p>The Chairman welcomed all attending members (17), co-opted members (4) and observers (20) from various countries (Argentina, Australia, Canada, Greece, India, Ireland, Japan, Mozambique, Norway, Romania, UK and USA).</p> <p>Introduction of everyone and members, co-opted members and observers were invited to contribute to the discussions.</p> <p>Apologies for not being able to attend were received from J. Smithers.</p> <p>Safety moment</p> <ul style="list-style-type: none"> <li>• Emergency number in Canada</li> <li>• Crossing the street – Canadian rules</li> </ul> <p>Presentation of each participant</p> <p>Agenda was reviewed and approved.</p> <p>The minutes of the previous meeting were approved</p> <p>The participants were asked to review or give their contact information and to sign the presence list.</p>
2	<p><b>ACTIVITIES OF COMMITTEE SINCE THE VIENNA MEETING (JULY 2018)</b></p> <p>The chairman presented the main activities related to the committee since the Vienna's meeting</p> <ul style="list-style-type: none"> <li>- The final version of bulletin 170 (French and English) have been released in 2018 <ul style="list-style-type: none"> <li>o Paper version is bilingual</li> <li>o Electronic version is only available in English on the ICOLD website – complete version will be available soon on the Balkema website</li> </ul> </li> <li>- Finalization of two chapters for the bulletin (2015-20)</li> <li>- Workshop on June 10<sup>th</sup> 2019 at Ottawa for the presentation of the bulletin « Flood Evaluation, Hazard Determination and Risk Management » <ul style="list-style-type: none"> <li>o About 70 attendees</li> </ul> </li> <li>- Workshop on June 10<sup>th</sup> 2019 at Ottawa for the presentation of the new bulletin to come <ul style="list-style-type: none"> <li>o 4 chapters were planned</li> <li>o About 25 attendees</li> </ul> </li> </ul>
3	<p><b>FLOODS MANAGEMENT ACTIVITIES IN 2018-19 – PRESENTATION BY COMMITTEE MEMBERS</b></p> <p>Presentation/Review of flood activities in different countries – presentation will be placed in our technical committee share space and will be share with some of the participants</p> <ul style="list-style-type: none"> <li>- Ireland (Brian O'Mahony) <ul style="list-style-type: none"> <li>o <i>River Lee – 2009 Flood – Update.</i> This case presented at our last two meetings is about a flood that occurred in 2009 and involved a partial flooding of a city in Ireland. The dam's owner (ESB) was found guilty of some of the damages even if the operation rules defined were respected and the peak outflow was 30% lower than the peak inflows. The Court of Appeal reversed the judgement</li> </ul> </li> </ul>

ITEM	DISCUSSIONS
	<p>at the end of 2017 and ESB was found not guilty. Case will go to Supreme Court later in 2019.</p> <ul style="list-style-type: none"> <li>- France (Emmanuel Paquet) <ul style="list-style-type: none"> <li>o Uncertainty from rainfall-runoff model parameters and extreme flood estimation by stochastic simulation</li> <li>o A distributed application of the SCHADEX stochastic method for extreme flood estimation</li> </ul> </li> <li>- Australia (Peter Hill) <ul style="list-style-type: none"> <li>o Townsville Australia – Recent Major Floods</li> </ul> </li> <li>- Czech Republic (Richard Kucera) <ul style="list-style-type: none"> <li>o Droughts in Czech Republic over the period 2015-2018 <ul style="list-style-type: none"> <li>▪ Similar droughts have been observed in other European countries such as Sweden and UK</li> </ul> </li> </ul> </li> <li>- Canada (Michel Tremblay) <ul style="list-style-type: none"> <li>o 2019 flood on the Ottawa River – preliminary report of the situation</li> </ul> </li> </ul>
4	<p><b>DISCUSSION ON THE 2015-20 BULLETIN ON “<u>FLOOD EVALUATION, HAZARD DETERMINATION AND RISK MANAGEMENT</u>”</b></p> <p>Discussion about the workshop held Monday and the changes to do to the chapters. A summary of the main elements of each chapter is presented hereafter:</p> <p>Chapter 1 - Role of flood volume (<i>B. Joos, Switzerland, M. Tremblay, Canada</i>)</p> <ul style="list-style-type: none"> <li>- No modification to the chapter based on workshop</li> <li>- A section of the chapter must be rewritten</li> </ul> <p>Chapter 2 - Stochastic approach to flood hazard determination (<i>Z. Micovic, Canada</i>)</p> <ul style="list-style-type: none"> <li>- Final version of this chapter is already available;</li> </ul> <p>Chapter 3 - Forecast for proactive flood risk management (<i>U. Müller, M. Kashiwayanagi</i>)</p> <ul style="list-style-type: none"> <li>- No modification to the chapter based on workshop;</li> <li>- Some figures will be revised to respect ICOLD and new editor publications rules</li> <li>- Text will be revised (to be more fluent in English)</li> </ul> <p>General comments</p> <ul style="list-style-type: none"> <li>- The target for each chapter is 30 pages (without considering case study and/or appendix);</li> <li>- Each chapter must include recommendations;</li> </ul>

ITEM	DISCUSSIONS
	<ul style="list-style-type: none"> <li>- Format should be modified based on the new template required by the new publisher</li> <li>- All chapters must be finalized for the end of August</li> <li>- Chapter will be reviewed by committee members in September</li> <li>- Final version is planned to be sent to the central committee office in October 2019</li> </ul>
5	<p><b>BULLETIN 2019-2022 -</b></p> <p>Discussion about the workshop held Monday afternoon. Four chapters will be part of the next bulletin; a fifth one will probably be added (not included in the 2015-2020 bulletin)</p> <ol style="list-style-type: none"> <li>1) Extreme flood estimation (A. Warren – N. Gautam)</li> <li>2) Flood Risk Management (Y. Huang)</li> <li>3) Uncertainty related to hydrological event (Z. Micovic – E Paquet)</li> <li>4) Envelope curves of recorded world maxima (P. Hill)</li> <li>5) Effect of combined hydrological events (K. Ng)</li> </ol> <p>Chapters have been discussed during the workshop and during the afternoon session. Comments have been noted by the leads and will be considered for the preparation of the first working draft (target date – February 2020). Team of three or four persons will contribute to work on each specific chapter. Peter Hill will lead the effort on the chapter “Envelope curves of recorded world maxima. All the committee members and some observers are ready to support the effort to develop a database that will be used to produce general and regional envelope curves that can be used as validation tool for extreme flood estimation (chapter 1).</p> <p>The order of the chapters will be rearranged for the bulletin. Chapters 1, 3, 4 and 5 are more related to hydrology and chapter 2 is more related to operation/management. In this context, we are considering the possibility to produce two bulletins.</p> <p>It is planned to discuss non-stationarity of hydrological series (climate change). Discussion with the chair of the Climate Change Committee are planned.</p>

ITEM	DISCUSSIONS
6	<p><b>PROGRAM OF ACTIVITIES FOR 2019-20</b></p> <p>Review of the main activities for 2019-20.</p> <ul style="list-style-type: none"> <li>- 2015-20 Bulletin             <ul style="list-style-type: none"> <li>o See section 4</li> </ul> </li> <li>- 2019-22 Bulletin             <ul style="list-style-type: none"> <li>o See section 5</li> </ul> </li> </ul>
7	<p><b>VARIA</b></p> <p>a) Information from the ICOLD Chairman's Meeting</p> <ul style="list-style-type: none"> <li>• Technical Committee Guidelines are in a revision process             <ul style="list-style-type: none"> <li>i. Guidelines to help present and future technical chairman to take charge of their respective committee                 <ul style="list-style-type: none"> <li>1. Comments provided and still accepted until the end of July</li> <li>2. Should be ready for next annual meeting</li> </ul> </li> <li>ii. Active members – two consecutive absences from the annual meeting and no active communication could lead to replacement in the committee</li> </ul> </li> <li>• Publication of Bulletins will be done through an international publisher.             <ul style="list-style-type: none"> <li>i. Review of new procedure to access ICOLD Bulletin</li> </ul> </li> </ul> <p>b) Procedure to access ICOLD website and share space of the technical committee was reviewed</p> <p>c) Conference call for bulletin follow-up</p> <ul style="list-style-type: none"> <li>• For each chapter – to be determined by each lead</li> </ul> <p>d) Next ICOLD meeting will be held in New Delhi (India) – From April 4<sup>th</sup> to 10<sup>th</sup></p>
8	<p><b>END OF MEETING</b></p> <p>Meeting was adjourned around 16:00</p>

T) AD HOC COMMITTEE ON PROSPECTIVE AND NEW CHALLENGES FOR DAMS AND RESERVOIR IN THE 21st CENTURY				T) COMITÉ AD HOC SUR LES PERSPECTIVES ET LES NOUVEAUX DÉFIS DES BARRAGES ET RÉSERVOIRS AU XXI <sup>e</sup> SIÈCLE	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in Vienna, 1 July 2018				Réunion à Vienne, 1er Juillet 2018	
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
France	DEROO	L.	Chairman	X	
Nigeria	ADEYEMI	J. (Ms)	Member		X
Turkey	AKER	I.	Member		X
Russia	CHERNYSHENKO	V.	Corresp. Member		X
United States	BLOHM	H.	Member		X (Jim Lindell presented Harry's PPT)
Morocco	CHRAIBI	A.F.	Member	X	
India	DAS	B.	Member		X
Vietnam	HOTAKHANH	M.	Member	X	
Japan	FUKUWATARI	J.	Member	X	
Brazil	MIGUEZ DE MELLO	F.	Member		X
Italy	HEGG	U.	Member		Resigned
China	WANG	S.	Member		X
Indonesia	FIRMAN	A.	Member	X	
Iran	HOSSEINNEZHAD	A.	Member		X
South Africa	ANDERSON	H.	Member	X	
UK	SCOTT	C.	Member	X	
South Korea	YEUN-KUN	O.	Member		X
Spain	MORALES	A.	Member	X	
Egypt	ABDELMOTALEB	A.	Member		X
Switzerland	LAZARO	F.	Member	X	

Also contributed: P. ROYET and JL GIAFFERI from France ; Greg SNYDER from Canada ; Jim LINDELL from USA.

## Progress Report

### ***Bulletin A on Prospective and new Challenges***

The bulletin was handed to the board and proposed for approval at the next general assembly.

Main conclusions have been summarized in a paper published in the symposium proceedings by Harry+Luc.

### ***Bulletin B on Low head low hazard dams***

Draft almost complete. The sub-committee dedicated to the issue held a meeting.

The first draft of the bulletin will be edited in French

### ***Bulletin C on “unusual” dams or reservoirs***

The bulletin will cover a general overview on the peculiarities of some specific dam or reservoir types.

- Off-stream storage
- Dams with empty reservoirs for flood mitigation
- Dams at sea for energy production and coastal protection (incl. large gates at sea)
- Reservoir utilization in a hydro-solar or hydro-wind combination
- Underground dams
- Dams or reservoirs designed to foster biodiversity

A series of contributions related to this theme was presented:

Henriette Anderson - changes in utilization of reservoirs / quality control during construction of small dams  
Ahmed Chraïbi - two dry reservoir dams in Morocco  
Junichi Fukuwatari - dry reservoirs for flood mitigation; experiences in Japan of from japanese engineers  
Adrian Morales - dry reservoirs for flood mitigation; experiences in South America  
Ali Nezhad (presented by Luc Deroo) – recent floods in Iran  
Craig Scott - floating solar PV

Luc Deroo - hydro-solar solutions

Aries Firman - dams at sea (Batam, Jakarta) and solar power at Cirata reservoir

Jim Lindell (to be confirmed) - California water projects

Felipe Lazaro - WorldBank activities: a water secure world for all

Work to be done before India2020 has been divided.

### ***Proposed ToR for a new Committee on Financing***

The proposed ToR were sent to the Board.

### ***Initiative on Dams in Arid and Semi-arid Context***

The opportunity of such a bulletin was discussed among the members. A preliminary scope will be prepared to be discussed next year.



U) DAMS AND INTEGRATED RIVER BASIN MANAGEMENT / U) BARRAGES ET GESTION INTEGRÉE DES BASSINS FLUVIAUX	
PROGRESS REPORT	RAPPORT D'ACTIVITÉ
Meeting in Ottawa, 11 <sup>th</sup> Jun 2019	Réunion à Ottawa, 11 Jun 2019

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First Name / Name / Nom Prénom		Status	Country	Presence	
Chairman					1
CIFRES	Enrique	CHAIRMAN	SPAIN	Present	
Vice-chairmen					
SADEGHIAN	M.S.	VICE-CHAIRMAN	IRAN	Absent	
UZUÇEK	Ergün	VICE-CHAIRMAN	TURKEY	Absent	
Members					
CARVALHO	Erton	MEMBER	BRAZIL	Absent	1
FERLAND	Martin	MEMBER	CANADA	Present	
TRONCOSO	Gabriel	MEMBER	CHILE	Present	
WU	Shiyong	MEMBER	CHINA	Absent	1
YUE	Pan		CHINA	Replacing Mr WU	
WILLMITZER	H.	MEMBER	GERMANY	Absent	
SEN	Siba Prasad	MEMBER	INDIA	Absent	1
NANDLAL	Sharma		INDIA	Replacing Mr SEN	
AMRON	Mochammad	MEMBER	INDONESIA	Present	
AHMAD	Zahida	MEMBER	IRAQ	Absent	1
HAKOISHI	Noriaki	MEMBER	JAPAN	Present	
KIM	Bongjae	MEMBER	KOREA (Rep. of)	Present	
ARBI	Hama Ould Sidi Mohamed	MEMBER	MALI	Absent	1
BROUWER	H.	MEMBER	NETHERLANDS	Absent	
IVANOV	Timofei	MEMBER	RUSSIA	Absent	
AVANCO	Roman	MEMBER	SLOVAKIA	Absent	1



U) DAMS AND INTEGRATED RIVER BASIN MANAGEMENT / U) BARRAGES ET GESTION INTEGRÉE DES BASSINS FLUVIAUX	
PROGRESS REPORT	RAPPORT D'ACTIVITÉ
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Name / Nom	First Name / Prénom	Status	Country	Presence	
WOLFHOPE	John	MEMBER	USA	Present	1
<b>CORRESPONDING MEMBERS</b>					
SHANNON	Brian	CORRESPONDING_MEMBER	AUSTRALIA	Absent	
MENDES	Adérito	CORRESPONDING_MEMBER	PORTUGAL	Absent	
ASIF BAIG	M.	CORRESPONDING_MEMBER	PAKISTAN	Absent	
THEPOT	R.	CORRESPONDING_MEMBER	FRANCE	Absent	

#### OBSERVERS

RYU	Minku		KOREA (Rep. of)		1
Dawe	Paula		CANADA		1
Guo	Xuyuan		CHINA		1
KIM	Seon UK		KOREA (Rep. of)		1
YUN	Jun Han		KOREA (Rep. of)		1
BACCHUS,	Florent		FRANCE		1

Total members 11

Total observers 6

TOTAL PARTICIPANTS 17



U) DAMS AND INTEGRATED RIVER BASIN MANAGEMENT / U) BARRAGES ET GESTION INTEGRÉE DES BASSINS FLUVIAUX	
PROGRESS REPORT	RAPPORT D'ACTIVITÉ
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## Progress report

The progress of Committee tasks followed the adopted agenda as follows:

- i. Report on Chairmen meeting. New guidelines for ICOLD Technical Committees as discussed. (as a result of Sunday chairmen meeting)
- ii. Chairman's report on advances
- iii. RoundTable on "Social Perception of the Role of Dams" in our own countries. It would be great having an intervention by any country represented in the Committee. It is no necessary to present a "report" but simply an exposition of how in your country region are this kind of issued dealt with.
- iv. Invited presentation on the results of the "Andean Workshop on Multipurpose projects in the context of climate change"
- v. Study cases on Stakeholders involvement in Basin Management plans, sharing benefits, win-win solutions: Indonesia, Chile, .. Spain, may be more?
- vi. Brainstorm on prioritization of topics and factors when analyzing the sustainability of dam projects at basin scale.
- vii. Discussion on the committee future and how to move forward.

The meeting was developed following the above-mentioned agenda.

- Chairman's report. He reminded recent meetings and the current road-map.
- Chairmen and vice-chairmen's meeting (30th June)
  - Improvements of Technical Committees activities
  - International publisher: Balkema. Some comments about intellectual propriety and selling policies.
  - New bulletins in the pipe. Pending of approval, translation under progress, pending of printing, etc..
  - Responsibility for personal data updating
  - Progress reports.
  - Regarding this committee: It was stated the adding the word "Integrated" to RBM (River Basin Management) is an ambitious challenge. We have been working in parallel



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- a) in preparing a methodology to process opinion of different groups of stakeholders for a good involvement in decision making when making decisions for River Management Plans
- b) in the conceptual factors to be taken into account IRBM in order to get sustainable solutions a basin level
  - The committee is in a crossroad and this year a break for reflexing about the way we need to move is a must.
- Special advice for registering in ICOLD as member and update data. Access to shared.space in ICOLD website as a must.

### Roundtable and study cases

Among others, one of the main issues for Integrated River Basin Management is the involvement of different stakeholders in River Basin Management Plans including dams.

Stakeholders potentially play a major role in:

- Social issues, public participation at basin scale
- Water sharing, international or not river basin and water rights or allocation conflicts at basin scale
- Socio-economic issues, sharing benefits and win-win policies
- Environmental issues
- Safety and related topics (land management, insurance policies,..)

A complete series of expositions from the present member countries was carried out by showing how river basin management plans are involving civil society in decision making, as follows:

Indonesia, presented a comprehensive analysis with three study cases: Jatibarang Dam, Kuningan Dam and Way Sekampung Dam, dealing with IRBM, Stakeholders, socio-economic and environmental aspects.

China dealt with River Basin Mechanism for Water Resources and water environment management showing the cascade plan for Yalong river as an example.



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USA presented *Dams and Integrated River Basin Management in USA* showing the distribution of responsibilities at federal, state and local level and the cases of some Basins in Texas.

Korea presented a case study on addressing harmful algal blooms issue in a dam project and social implications.

Chile, made reference the the Andean Worskhop on multipurpose reservoirs and climate changes as well as references to Chilean cases of win-win solutions and civil society involvement, specially for safety at basin level.

Spain dealt with the structure of Basin Organisations working since 1926 and how stakeholders play different roles into it. Also how European Water Framework Directive and Strategic Environmental Directive mandate the inclusion of Civil Society in Decision Making, specially in River Basin Management Plans.

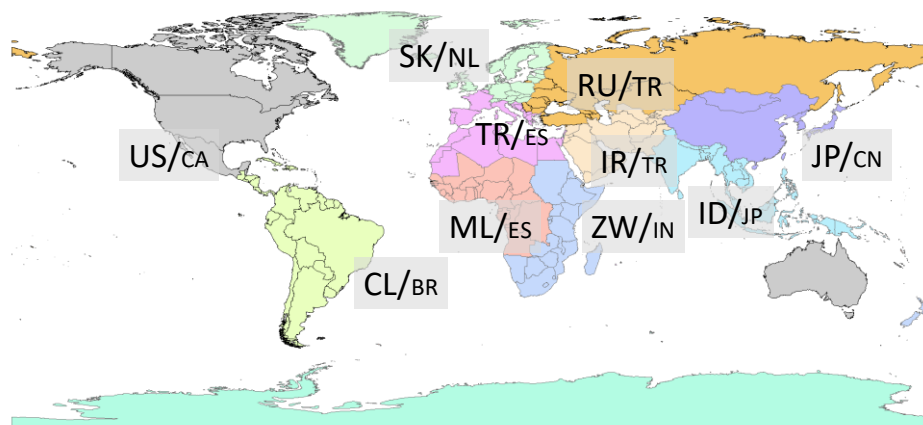
Also Canada, France, Japan, India and Thailand gave some remarks about their own particularities for implementing IWRM in the River Basin Planning.

After a brainstorming about study cases selected, it was considered necessary a change of strategy. Instead of a project as a whole to be compared, study cases will be selected for covering a single factor.

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A final round for identifying single aspects study cases will be carried out since Ottawa 2019. A distribution of responsibilities for identifying study cases was allocated in Vienna 2018. The responsibilities for identifying study cases to be considered as references are



shown in the map below:

## Bulletins

The bulletin under preparation, is titled “Involving stakeholders for assessing dam project’s sustainability.: Methodology”. The table con contents is:

- 1 Forewords & Rationale
- 2 Background
  - 2.1 From Rio 92: Public Participation
    - 2.1.1 Rio 1992
    - 2.1.2 Aarhus Convention



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- 2.2 IHA protocol
- 3 Methodologies
- 4 Architecture of proposed methodology
  - 4.1 Hybrid method. Combination of DELPHI, AHP and VIKOR
  - 4.2 Comparison between factors
  - 4.3 Keys for software development
- 5 Factors to be assessed
  - 5.1 Water allocation
  - 5.2 Sharing Benefits and win-win policies
  - 5.3 Social Issues
- 6 Reference cases: Some examples
- 7 Moving forward

Also a document on “Social Perception of dams” is found as a must for fulfilling the ToR. It can be a bulletin or an internal report or even a position paper.

By the end of July members are committed to send proposals for moving forward and assume roles for writing documents or chapters.

# Report from Technical Committee V Hydromechanical Equipment

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## 87<sup>th</sup> Annual Meeting in Ottawa, Canada

### Attendees

#### Chairman

Canada	Jerry Westermann
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#### Vice-Chairman

Sweden	Andreas Halvarsson
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#### Members

Australia	Ian Landon-Jones
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United Kingdom	Ken Grubb
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Japan	Hiroki Yamamoto
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Austria	Philip Kotrba
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Russia	Aleksander Kozyrev
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Iran	Kaivan Kavianpour
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South Africa	Rudolph van Wyk
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United Kingdom	Russ Digby (Co-opted member)
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## Summary of Discussions

### Administrative Matters

Presentation of a new committee members Aleksander Kozyrev (Russia) and Kaivan Kavianpour (Iran).

The committee members were informed of what was said and stated at the Technical Committee Chairman's meeting on June 10, 2019.

The new ICOLD bulletin template will be applied to the Bulletin the committee is working on.

E-books will be used to expedite publishing. Bulletin translation is strongly encouraged by the committee to expedite publishing. The English version can be published prior to French translation.

### Technical Discussions during Meeting

The following summarizes the technical discussions.

#### General

Discussions were held regarding the chapter titles and sequence for the bulletin under preparation “Best Practices for Achieving Reliability of Flood Discharge Gates”.

- The Fault Tree example the was previously located in Chapter 6 will become Appendix A.
- *Outstanding from 2018:* The bulletin should contain a glossary. There may be an existing glossary within ICOLD that could be adapted for our bulletin. Jerry requested this from some other committee chairmen but has not received one.
- The bulletin should make appropriate references to other information sources and other committee bulletins where relevant. There will be a common list of references at the end of the bulletin. The introduction will also refer to the most relevant other committees.
- The recently prepared guidelines will be incorporated into the bulletin within Chapter 3.

### Review of Chapter Progress

The following discussions relate to the specific chapters. Some of the comments have been carried forward from previous reports.

#### Chapter 1 - Introduction

- The completion of this chapter is intentionally being left until a later date as it will be similar to an executive summary.
- (Comments from 2017 report)

- The chapter should state “there is no safe position for a spillway gate”
- Reference should be made to the importance of communication systems
- The chapter should be supplemented with text concerning reliability and dam safety
- (Comments from 2018 report)
  - The scope and applicability of the bulletin will be covered in this chapter. For example, Piano Key weirs and fuse plugs will not be covered by the Bulletin.
  - Discuss the terms spillway and dam gate.
- The chapter should contain a statement to the effect “The most reliable arrangement for passing flood discharge is one that utilizes a passive device (e.g. overflow weir).”
- The introduction should make reference to other ICOLD committees and/or bulletins that are most relevant to this one. (Ian to assist Jerry)

## Chapter 2 – Incidents and Failures

- Inclusion of published photos would be useful. Photos need to state “Courtesy of \_\_\_\_”
- British Dam Society may have additional incidents.
- Aleksander will revise the description for the Sayano Shusenskaya incident and add a photo. He also will add a new failure that occurred as a result of brittle steel members.
- A failure summary table will be added at the beginning of the chapter.
- The statistical data in this chapter has been moved to Chapter 6

## Chapter 3 – Fundamental Principles

- The primary purpose of this chapter is to summarize the overriding principles and considerations applicable to reliability of spillway gate equipment.
- (Comments from 2017 report)
  - The chapter should mention communication systems, designing for future maintenance and should reference Chapters 8 & 9 as they relate to availability of personnel and access to equipment
  - This chapter should address design philosophy without getting into too much detail. Concepts such as “Fail to Safety” and “Battle Switch” could be incorporated but are also discussed in Chapter 5
- The Guidelines that were prepared previously will be incorporated in this chapter. They still need some reorganization. Ken and Ian to assist. Jerry will revise upfront paragraphs.

## Chapter 4 – Gate and Hoist Types

- The title of the chapter will be changed to “Types of Gates, Machinery and Controls”

- Based on the scope of the Bulletin, which applies to surface spillway gates, some of the gate types will be removed including, Ring Follower Gate & Caterpillar Gate. The image for the Fixed-Wheel Gate will be replaced with a surface gate.
- New sub-sections will be added to the chapter under the new section Power and Controls, including
  - Primary Power Systems
  - Standby Power Systems
  - Controls (to include Instrumentation and Monitoring)
- The latest version on the Share Space reflects these and other changes

## **Chapter 5 – Duty, Specifications and Standards**

- Statistical data from Chapter 2 has been combined into this chapter. Further consideration may be needed to decide which data to include.
- It was generally agreed that a new paragraph should be added to emphasize the importance of QA during the manufacturing process

## **Chapter 6 – Risk Assessment**

- The statistical failure data from Chapter 2 has been moved to this chapter
- The Fault Tree example has been moved to the back as Appendix A. Ian will work another example that will allow the reader to see two methods.

## **Chapter 7 - Commissioning**

- This chapter has improved since the last review but still requires some work.
- For example, the statement “The transfer of equipment ownership occurs on the date of provisional acceptance” is not necessarily true and will depend on the contract, country, etc.
- Terminology used in the chapter needs to be reviewed
- Kaivan and Rudolf will review and assist M.B. Akalay

## **Chapter 8 – Inspection, Testing and Exercising**

- Generally, this chapter is complete, though some minor revisions may still be required.

## **Chapter 9**

- Generally, this chapter is complete, though some minor revisions may still be required.

## **Schedule**

In order to expedite completion of the bulletin, all chapters must be completed by the end of July 2019. This will provide time for review and issue to ICOLD by year end.

Prepared by J. Westermann

Reviewed by A. Halvarsson

## W) Selection of dam type

## W) Sélection de type de barrage

Meeting in Ottawa, 11 June 2019

Réunion à Ottawa 01 Juin 2019

MEMBERSHIP LISTE DES MEMBRES		MEETING Réunion		
COUNTRIES/PAYS	MEMBERS/MEMBRES		Present (expected)	Absent/Substitutes
Norway	Ole John BERTHESEN	Chairman	Y	
Colombia	Andrés MARULANDA	Vice-C.	Y	
Australia	Robert WARK	Member	Y	
China	ZHOU Jianping	Member	Y	
Ethiopia	Lulseged ABAYNEH	Member		
France	Alain CARRERE	Member		
France	Michel GUERINET	Member	Y	
Luxemburg	Wynfrith RIEMER	Member	Y	
Iran	Behzad HAZRATI	Member		
Japan	Nario YASUDA	Member	Y	
Spain	Carlos GRANELL	Member	Y	
Switzerland	Harald KREUZER	Member		
United Kingdom	Peter MASON	Member	Y	
OBSERVERS				

ICOLD COMMITTEE W ON SELECTION OF DAM TYPE

AGENDA for MEETING AND REPORT

**ICOLD 2019 Ottawa, Canada**

COMMITTEE WORKING SESSION: **WORKING SESSION: 08.30 – 11.00 Tuesday, 11-June-2019,**

**1 Membership & Terms of Reference (Berthelsen)**

- 1 Roster update, Registration on ICOLD Webpage, Housekeeping Personal Data (**OJB**)
- 2 Information from ICOLD Officers & Technical Committee Chairmen Meeting (**OJB**)

**2 Review current status of the bulletin:**

**3 Terms of Reference (OJB)**

**4 Status of bulletin (OJB)**

- i. A draft bulletin was completed on 8 March 2019 and has been circulated to the national committees. It was substantially complete but was missing illustrative photographs.
- ii. We have received comments from the Netherlands National Committee and a response has been sent. We have received comments from Ruben Jungejan (coopted, Netherlands) on the Monte Carlo simulations and all issues have been resolved.
- iii. We have no comments from other national committees. Informal enquiries during the Ottawa meeting with some national committees shows that these had no comment and did therefore not respond.
- iv. Bulletin format (template, layout, font etc.) (**OJB**)

**5 DISCUSSION**

Minor changes were made and the bulletin is now complete and ready for adoption at the Annual Meeting.

Ole John Berthelsen  
Chairman, ICOLD Committee W on Selection of Dam Type  
Ottawa, 12 June 2019

Y) GLOBAL CLIMATE CHANGE AND DAMS, RESERVOIRS AND THE ASSOCIATED WATER RESOURCES				Y) CHANGEMENT CLIMATIQUE ET LES BARRAGES, RESERVOIRS ET RESSOURCES EN EAU ASSOCIÉES	
PROGRESS REPORT				RAPPORT D'ACTIVITÉ	
Meeting in OTTAWA, June 11, 2019				Réunion à OTTAWA, 11 Juin 2019	
MEMBERSHIP / LISTE DES MEMBRES				MEETING / Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES			Present	Absent/Substitutes
Austria	KLING	Harald	Member (2018)	X	
Canada	DEMARTY	Maud	Member, Vice-Chair	X	
France	AELBRECHT	Denis	Member, Chairman	X	
Germany	MOELLER	Markus	Member (2018)	X	
India	AGARWAL	Tarun	Member (new, 2019)		
Iran	ABOLGHASEM	Mohsen	Member	X	
Italy	MONTI	Carlo	Member		X
Japan	TSUTSUI	Junichi	Member	X	
Korea	KWON	Hyun-han	Member (2018)		X
Morocco	MAHFOUD	Jamal	Member		X
South Africa	DE JAGER	Gerald	Member		X
Spain	GRANADOS GARCIA	Alfredo	Member (2018)	X (afternoon)	
	BERGA	Luis	Co-Opt Member	X (morning)	
Sweden	HALLBERG	Kristoffer	Member	X	
United Kingdom	USHER	Steven	Member	X	
USA	BUNTE-BISNETT	Denise	Member (new, 2019)	X	
World Bank	KARKI	Pravin	Co-Opt Member		X
INVITED Participants : - Bill GIRLING (IHA, UK and Canada) OBSERVERS / SUBSTITUTES :					
Country	Representative Name		email	status	
Canada	Kevin SAGAN (Manitoba Hydro)		<a href="mailto:ksagan@hydro.mb.ca">ksagan@hydro.mb.ca</a>	Observer	
Canada	Amber SEEDS (EDC)		<a href="mailto:aseeds@edc.ca">aseeds@edc.ca</a>	Observer	
The Netherlands	Cees Henk OOSTINGA (Rijkswaterstaat)		<a href="mailto:ceeshenk.oostinga@rws.nl">ceeshenk.oostinga@rws.nl</a>	Observer	



**ICOLD Technical Committee « Y » on Climate Change – Participants to the annual meeting in OTTAWA, June 11, 2019**

## 0. Agenda

Agenda was prepared and distributed to members few weeks before the meeting, and adjusted with members feedbacks. The technical discussion was mainly structured around two categories of interventions:

- Focus topics : on some specific new information
- Presentations from TC members about methods and/or case studies directly related to TC Terms of Reference

<b>Morning : 09:00 – 12:00</b>	Who	Time
1. Getting acquainted : TC members and observers are invited to introduce her/himself shortly Committee Y roster update <b>Vice-chair position is open : candidates ?</b>	All	09:00 – 09:20
2. TC “Y” share space on ICOLD website : update	D. Aelbrecht (France)	09:20 – 09:30
3. Completion of translation of bulletin 169 in French : status and update	D. Aelbrecht (France)	09:30 – 09:35
4. TC “Y” work plan reminder : - Theme 1 : <b>Climate-induced Water shortage and Drought Management</b> - Theme 2 : <b>Flood risk evolution associated to climate change</b> - Theme 3 : <b>Assess the role of hydropower in climate change mitigation and new energy mix</b>	D. Aelbrecht (France)	09:35 – 09:50
5. <b>Focus 1</b> : the economics of climate change adaptation and resilience : how to solve the economic/ecological gap ? Some thoughts to share with TC “Y” members	S. Usher (UK)	09:50 – 10:50
<i>Coffee break</i>		10:50 – 11:10
6. <b>Focus 2</b> : Publication of IHA “Hydropower Sector Climate Resilience” Guide (May 2019) : structuration of the guidelines in phases ; domains of application ; deployment ; results of testing on real	B. Girling (IHA)	11:10 – 12:00

cases		
<i>Lunch Break – 12:00 to 01:30 pm</i>		12:00 – 01:30
<b>Afternoon : 01:30 pm – 04:30 pm</b>		
<p>7. <i>Climate change activities and updates from TC members and national committees :</i></p> <ul style="list-style-type: none"> <li>- Any existing or future national guidelines ?</li> <li>- <b>Case studies reports related to Theme 1, Theme 2 or Theme 3 of our T.O.R. ;</b></li> <li>- Any information about recent climatic events with significant impact in your country ?</li> </ul> <p><b>Presentation 1 : Harald Kling (Pöyry, Austria) – 40 min.</b>  <b>“Climate change impact assessments for hydropower – Examples from Europe and Africa”</b></p> <ul style="list-style-type: none"> <li>- Key features of climate change studies done by Poyri in recent years for Albania, Germany, West Africa and Zambezi basin</li> <li>- Compare the methods used to the new climate resilience guidelines. What was common, what was missing, what was done differently?</li> </ul> <p><b>Presentation 2 : Kristoffer Halberg (Sweden) – 35 min</b>  <b>Case study of a 3 millions euros investment in hybridation of Hydro and Battery (5MW/6MWh) in Sweden, to limit Hydro wear &amp; tear and balance PV and wind power variability</b></p>	<p>H. Kling (Austria)</p> <p>K. Hallberg (Sweden)</p>	01:30 – 02:45
<i>Coffee break</i>		02:45 – 03:15
<p>8. <i>Climate change activities and updates from TC members and national committees (Cont'd) :</i></p> <p><b>Focus 3 – 15 min: IPCC SR15 report</b>  <b>What to be learned from IPCC SR15 special report issued in 2018 and its conclusions/statements ?</b></p> <p><b>Presentation 4 : Junichi Tsutsui (Japan) – 30 min.</b>  <b>Some results about the role of hydropower found in the IPCC SR15 scenario database, in relation to Theme 3 of our Technical Committee TOR – 30 min.</b></p> <p><b>Presentation 5 : IRCOLD information about recent 2019 flooding event – 15 min.</b></p>	<p>D. Aelbrecht (France)</p> <p>J. Tsutsui (Japan)</p> <p>M. Abolghasem</p>	03:15 – 04:00
9. <b>Conclusions of meeting:</b>	D. Aelbrecht	04:15 – 04:45

<ul style="list-style-type: none"> <li>- Project of future publications or bulletins of our TC : which contents : topical focuses, case studies reports, recommendations, ...</li> <li>- Work plan update and future actions</li> </ul>	(France) New Vice-chair	
<b>Meeting minutes preparation : 04:45 pm – 05:15 pm</b>		
10. Meeting minutes preparation	Denis and new Vice-chair	30 min.

## 1. Changes in the TC Y members list

Each participant takes few minutes to introduce her/himself.

Bill Girling from IHA is participating as an invited speaker, to present the recently published IHA Guide on “Hydropower Sector Climate resilience” – see item 6 of the agenda

Few changes in our TC members, and new members are welcome:

- George. Annandale (USA) decided to leave and resign from his US representative and subsequently Vice-Chair roles ; Denis Aelbrecht expresses his warm thanks and gratitude to all the work and inspiring information that George provided to the TC since about 5 to 6 years.
- Denise Bunte-Bisnett is taking over US representative role
- Vice-chair position becomes open. At the end of the meeting, Maud DEMARTY (Canada) proposed to contribute as new Vice-Chair ; she received an agreement from all other members.
- Tarun Argawal (India) has been officially nominated by Indian COLD as member of our TC

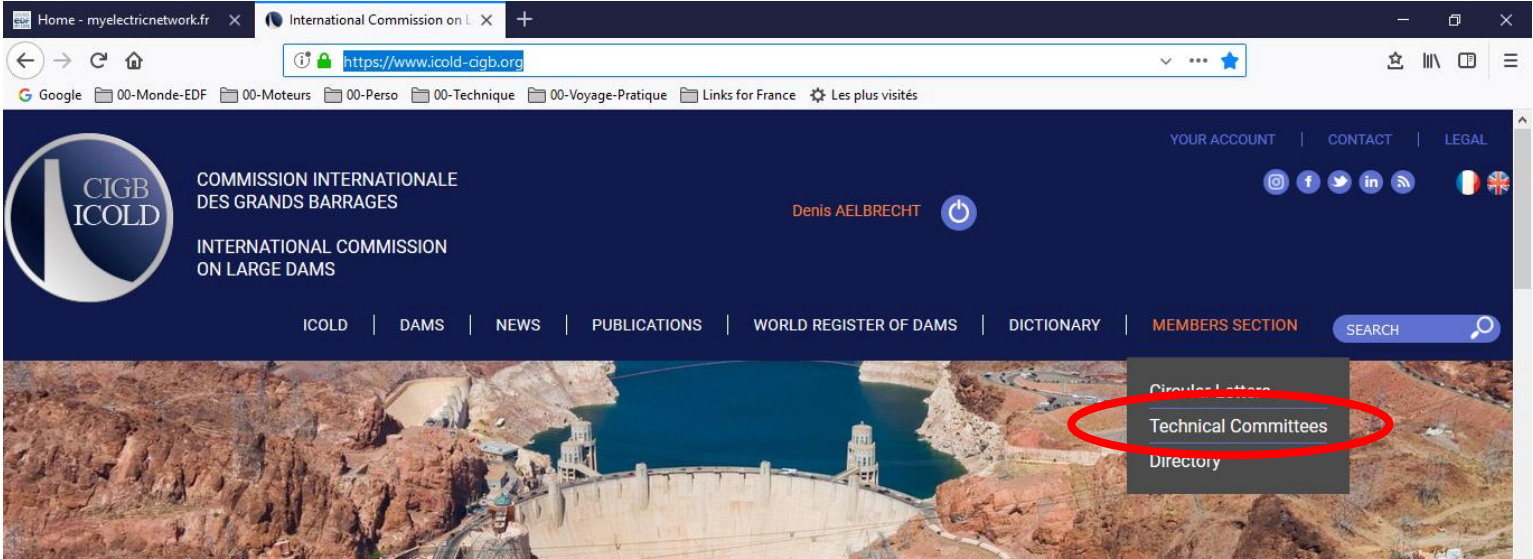
Chairman will interact with some national committees as their nominated members are not participating to our TC activity in any ways (Korea, Morocco, Italy).

Chairman also reminds his call for a participation of additional African countries in our TC activity (sub-saharian areas), given their potentially high exposure to climate change effects.











## 2. Website

Denis informs about the use of the “Share space” on the ICOLD website for future information sharing among TC members : <https://www.icold-cigb.org/>

- All information of TC activity will be shared using the website, in the “Technical Committees” section :



The screenshot shows the ICOLD website interface. The header includes the ICOLD logo, the text 'COMMISSION INTERNATIONALE DES GRANDS BARRAGES' and 'INTERNATIONAL COMMISSION ON LARGE DAMS', and a user profile for 'Denis AELBRECHT'. A navigation menu at the top lists 'ICOLD', 'DAMS', 'NEWS', 'PUBLICATIONS', 'WORLD REGISTER OF DAMS', 'DICTIONARY', and 'MEMBERS SECTION'. A dropdown menu is open under 'MEMBERS SECTION', with 'Technical Committees' highlighted by a red circle. Below the website screenshot is a table listing various committees.

W	SELECTION OF DAM TYPE (2015-2018) (AD HOC Committee)	<a href="#">T.O.R.</a>		
X	FINANCIAL AND ADVISORY (AD HOC Committee)	<a href="#">T.O.R.</a>		
Y	CLIMATE CHANGE (2017-21)	<a href="#">T.O.R.</a>		
Z	CAPACITY BUILDING AND DAMS (2017-21)	<a href="#">T.O.R.</a>		
ZX1	REGIONAL CLUB	<a href="#">T.O.R.</a>		

- Denis will distribute to all TC members the instructions for registering in an attached document to these minutes
- Information on the Share space is formally restricted to ICOLD-TC members
- TC members do not have access to other TC Share spaces
- It is important to remind that every member has equal rights of edition on the Share space : adding, deleting files ... : please, be careful when managing files on the Share space !!

⇒ **All presentations shared during the TC meeting in Ottawa will be uploaded on the Share space.**

### **3. Translation in French**

Status in June 2019: translation is about 95% completed and so completion is imminent. Final global review must be done in the next months. English and French versions will be sent to Balkema for final editing and publication before the end of 2019.

Denis reminds the importance of the French version for some francophone countries, particularly in Africa.

### **4. TC TOR and workplan structure**

Since TC meeting in 2017, TOR and TC work plan has been refined and structured in 3 complementary Themes :

- Theme 1 : Climate-induced Water shortage and Drought Management
- Theme 2 : Flood risk evolution associated to climate change
- Theme 3 : Assess the role of hydropower in climate change mitigation and new energy mix

For Theme 2 : cooperation with TC “S” (Flood Evaluation and Dam Safety) and TC “U” (Dams and river basin management) will be explored to make sure there is no overlap, check if climate change issues are integrated in their work, and look for potential synergies

For Theme 3 : case studies should cover all “Flexibility solutions” in which Hydro can bring a role :

- New storage capacities
- Hybridation of Hydro + Battery
- Hybridation of Hydro + PV (floating and non-floating)

- Hybridation of PSP + Wind
- VPP

## **5. Focus 1 : the economics of climate change**

S. Usher (UK) shares his exploring thoughts about concepts of climate change economics

He introduces to the difference between “Environmental economics” vs “Ecological economics” :

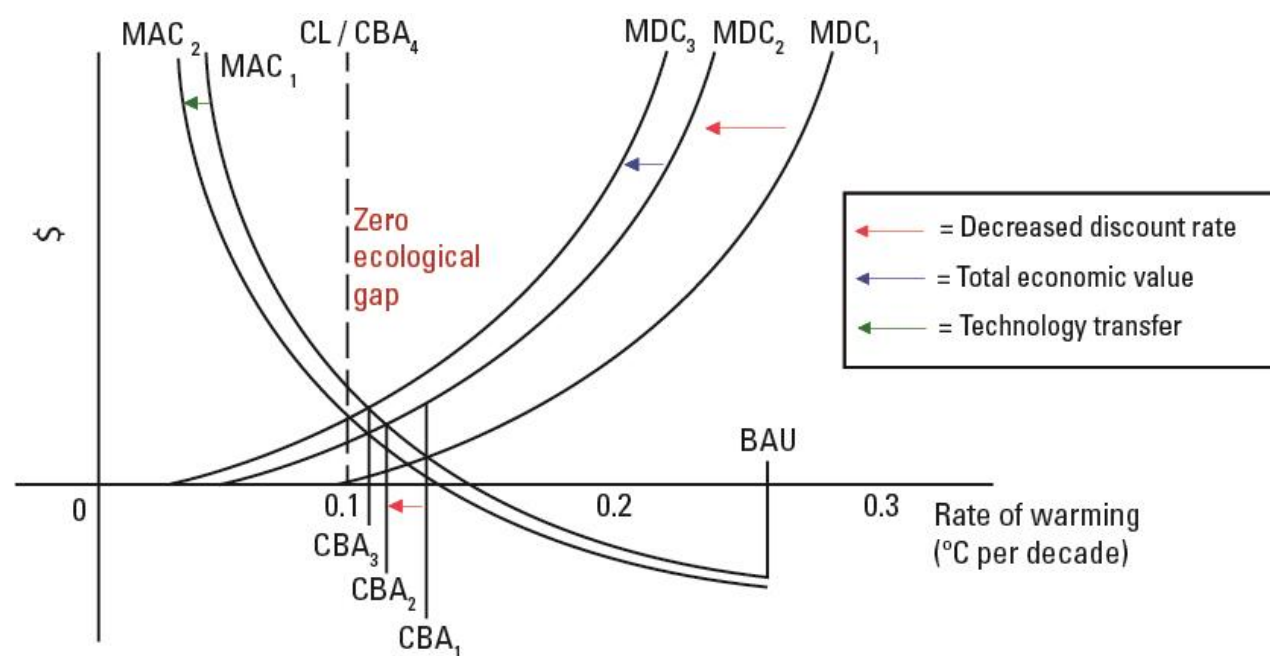
- Environmental economics : relies on discount rate for costs and benefits, NPV approach ; linear cost functions ...
- Ecological economics :
  - No discount rate
  - No compensation / no substitution
  - Critical threshold effect

Indicator of (weak) sustainability :  $\text{greenGDP} = \text{GDP} - \text{Environmental degradation costs}$

He also mentions the different methods/tools for evaluating the Environmental costs.

His reflections are summarized on a synthetic plot that clearly identifies all the factors that could be used to reduce the ecological gap between :

- a Cost-Benefit Analysis or CBA optimum (deduced from “Environmental economics” approach): see CBA points
- a Critical Limit of acceptability or CL on the graph (based on “Ecological economics” approach)



MAC = Marginal Abatement Costs

MDC = Marginal Damage Costs

CL = Critical Limit

BAU = Business as Usual

CBA = Cost Benefit Analysis Optimal

Potential future steps might be to work on :

- How to evaluate the Total Economic Value of Hydropower (TEV)
- New Cost-Benefit Analysis methods

## 6. Focus 2 : IHA : presentation of the “Hydropower Sector Climate Resilience” Guide

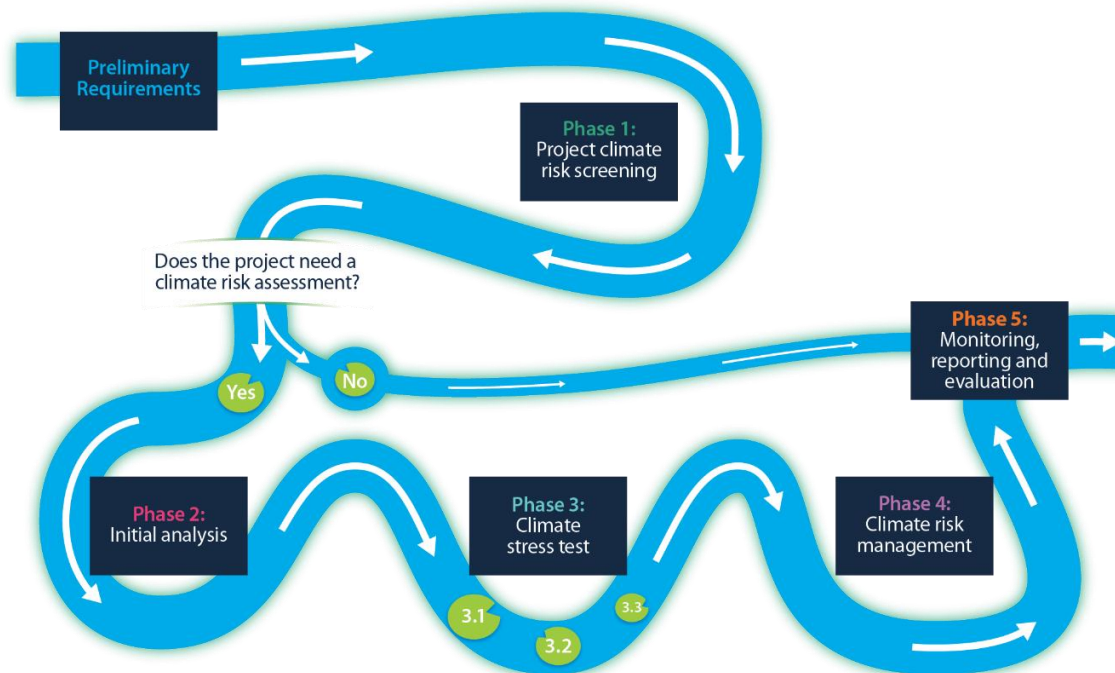
This focus presentation is given by Bill Girling (Senior hydropower Specialist, IHA), as invited speaker to our TC.

The Guide has been just published in May 2019 during the World Hydropower Congress in Paris, and is freely available on : <https://www.hydropower.org/publications/hydropower-sector-climate-resilience-guide>

The Guide is complementary to the IHA sustainability protocol.

ICOLD TC Y has been actively involved in the process of consultation and finalization of the Guide, along with other international organizations. Denis as chairman of the TC was involved in the Advisory Expert Panel.

The Climate Resilience analysis framework is based on 5 Phases (see following figure) – they do not impose precise methods ; they are not prescriptive.



The Guide is applicable to existing or future projects, large or small projects ; and the framework is conceptually applicable to any other water resources assets than Hydropower, through slight adaptation (risk indicators definition, performance metrics, ...).

## **7. Climate change activities and updates from TC members and national committees**

- **H. King (Austria) : “Climate change impact assessments for hydropower – Examples from Europe and Africa”**

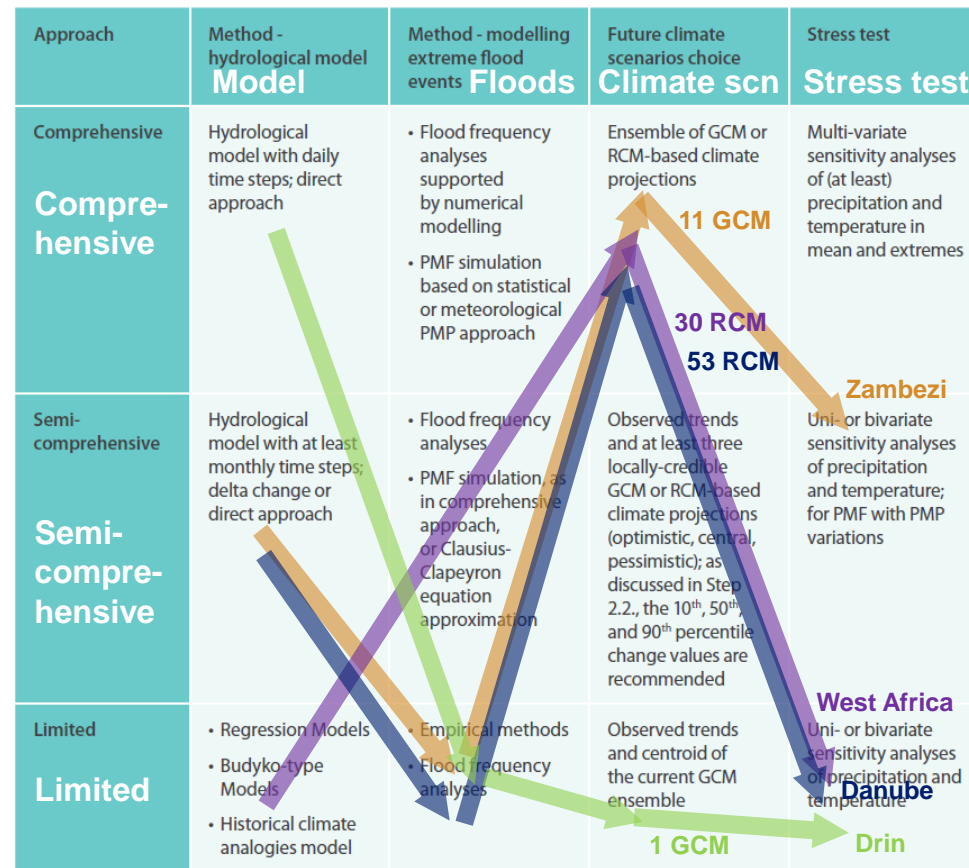
Application of climate change impact assessment framework to different case studies:

- Drin river (Albania)
- Danube river (Austria)
- Niger (West Africa)
- Zambezi river (SE Africa)

And comparison of approaches with the IHA Climate Resilience Guide – see following picture extracted from the presentation.

The variety of approaches in these studies is driven by:

- Data availability
- Potential risks identified with the client
- Budget allocation



⇒ All these Case studies can be used for Theme 1

- **Kristoffer Hallberg (Sweden) : Case study of a 3 millions euros investment in hybridation of Hydro and Battery (5MW/6MWh) in Sweden, to limit Hydro wear & tear and balance PV and wind power variability.**

The deployment of new intermittent and non dispatchable renewable power sources (wind mainly), induces new needs for the Swedish power grid : variability of grid frequency is increasing ; and FCR needs at very short term time scale may generate higher wear & tear for Hydro Kaplan units.

⇒ This new project could be used as potential Case Study for Theme 3.

- **Focus 3 : Denis Aelbrecht (France) : Conclusions and statements from IPCC SR15 special report issued in 2018**

Denis presents the conclusions and statements coming the SR15 IPCC report published in Oct. 2018. IPCC is a major source of information for our TC activity. SR15 report is a kind of WARNING report that identifies factors and possible guidance for limiting global warming at 1.5°C. This limitation would require much stronger climate mitigation actions and efforts never implemented, and far from current commitments of Nations.

⇒ SR15 report can be downloaded from IPCC website : <https://www.ipcc.ch/sr15/>

- **Junichi Tsutsui (Japan) : Some results about the role of hydropower found in the IPCC SR15 scenario database**

Junichi presents the trends that can derived from SR15 IPCC report as regard to the possible evolution of Electricity share in the Energy sector, and the evolution of role of Hydropower, depending on scenarios of climate mitigation levels (Baseline, 1.5°C, 1.5° OS, 2.0°C, ...)

⇒ This information would be very interesting for general information chapter(s) for Theme 3

- **Mohsen Abolghasem (Iran) : IRCOLD report on 2019 recent flooding event**

Mohsen reports on very recent flooding event in some iranese regions. The event reveals the lack of global Flood Management Plan and need for new storage/reservoirs to handle increasing variability between consecutive drought and flooding periods

⇒ This information could be interesting as a case study for Theme 2.

## **8. Future Work Plan**

TC members agree on the following actions in the view of producing future TC Y bulletin(s):

- Each Theme (1, 2, and 3) of our TOR will give the opportunity to create an integrated bulletin or separate bulletins
- Option 1 : final product = 1 single integrated bulletin ; problem : it would be a very long document, and not so easy to handle for our profession readers
- Option 2 : 3 separate bulletins + a common chapter at the beginning of each separate bulletins with a schematic visual synopsis providing the global picture of “global integrated issues” associated to climate change for dams and reservoirs, and showing how each bulletin contributed to a part of these global integrated issues

Option 2 seems to be preferred at this stage

- Each part corresponding to each Theme, will be structured with :
  - a “short” general and methodological section (15 to 20 pages)
  - an inventory of case studies (3 to 5 pages each)
- Maud Demarty proposes to establish a common template for case study presentation, to ensure homogeneity
- Case studies inventory will be summarized in the next weeks by Denis, based on propositions from previous TC meeting previous + new additional ideas discussed during the current TC meeting ; each case Study will have leading author(s) identified among TC members.

Depending on progress, a 1 or 2 year(s) of extension might be needed to complete bulletin(s) preparation.

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**XX)YOUNG ENGINEERS FORUM****PROGRESS REPORT**

Meeting in Ottawa, Canada, 10 June 2019

**PARTICIPATION****LISTE OF STEERING GROUP****COUNTRIES/PAYS****MEMBERS/MEMBRES**

COUNTRIES/PAYS	MEMBERS/MEMBRES	Present	Absent/Substitutes
Norway	Priska H. HILLER (Chair)	P	
United States	Amanda SUTTER	P	
United Kingdom	Sam TUDOR	N	
Russia	Tim IVANOV	N	
Canada	Leila OUAHIT	P	
Mozambique	Elias BAPTISTA	P	
Italy	Giulia BUFFI	N	

**XX) GROUPE DES INGENIEURS JEUNES****RAPPORT D'ACTIVITÉS**

Réunion à Ottawa, Canada, 10 juin 2019

**MEETING****Réunion****YOUNG ENGINEERS FORUM (YEF)****Notes of Meeting – 2019 Ottawa, Canada****16:30 – 18:00 Monday June 10, 2019****Shaw Center, Ottawa, Canada****AGENDA**

- 1) Welcome, Meeting Agenda
- 2) Keynote Presentation by Boris Martin (Engineers Without Borders)
- 3) YEF Information
- 4) Election of new YEF Steering Committee
- 5) Small Group Discussions
- 6) Other business & Close

## 1 WELCOME

Welcome of the approximately 92 participants (The Young Engineers Forum (YEF) is for members < 40 yr of age). The meeting started with a brief introduction of the agenda by Priska Hiller.

## 2 KEY NOTE PRESENTATION BY BORIS MARTIN

Boris Martin, CEO of Engineers Without Borders (EWB) Canada, held an inspiring keynote about “An Ecosystem Approach To Innovation”. He challenged us to talk for 2 minutes with our sitting neighbor about “What is the purpose of your career?”. Purposes such as “doing useful work”, “having a job that is complying with my personal values” were mentioned. EWB Canada aims to “catalyze changes that address the root causes of poverty and inequity by investing in people and ideas that will contribute to building an equitable and sustainable world.” Boris Martin presented an interesting case about broken water pumps in Malawi. He illustrated that the solution for the problem is not always technical and motivated for seeing problems in a broader way to find good and sustainable solutions. One strategy is to identify the problem, define the problem, examine options, evaluate the outcomes and finally act on your strategy.

## 3 YEF INFORMATION

This information started with a recap of the growth of the ICOLD YEF as this was the 9<sup>th</sup> meeting. It was announced that 22 countries now have national committees. Two new national YEF were founded in France and Switzerland between the ICOLD Annual Meeting 2018 and 2019. There are several countries interested and are working on a national YEF. Participants were reminded of the email contact list and LinkedIn group. Requirements of YEF Steering Committee members were stated. During the last year the activity in the [YEF LinkedIn group](#) was increased. YEF was also represented with a video message at the 90<sup>th</sup> Anniversary of ICOLD in Paris. Out of a suggestion during the YEF social gathering in Vienna, the YEF steering group tested the possibility for online meetings. On 30<sup>th</sup> April 2019 the first official YEF online meeting was held as Google Hangout on the Air and streamed live on YouTube, <https://lnkd.in/gAFansg> (the video is still available online). Furthermore, Leila organized a Mentorship Opportunity during the Ottawa meeting. Young engineers can meet an experienced mentor for a round table discussion.

## 4 SMALL GROUP DISCUSSIONS WERE HELD

Each of the Steering Group members selected a topic and the YEF meeting broke into small group discussions to encourage participation. The groups were as follows:

- Best ways to engage students (Hiroki)
  - We shared the thoughts about the problem that the number of students who want to become dam (or civil) engineers is decreasing. More scholarship programs by companies, more courses and laboratories about dam in universities might change students minds. The group discussed support by ICOLD for students to attending the annual meeting may be a good opportunity for them, and also Student-Forum may be interesting. At last we remarked that any actions will be mainly the responsibility of each national committee because the situations for students differ from country to country.

- Working in foreign country (Priska)
  - The group exchanged thoughts and experiences about working and living abroad. Everybody had experience from either projects abroad and/or living abroad. A common challenge is language and there were examples from projects with the contract in one language, consultants in an other, contractor in a third and finally the workers talking in a fourth language. In addition, culture matters are also reflected in language.
- Being member in a technical committee (Amanda)
  - The group on technical committees was quite large, with many first time ICOLD attendees. We began by having each person to introduce themselves, stating which country they represent, which workshop they attended and which committee meeting they plan to attend. The different levels of committee participation were discussed (full members, co-opted members, and observers) as well as how to join. Participation in technical committees was encouraged.
- Challenging projects of the year (Jiri)
  - Everybody presented his/her most challenging project from the last period of work. Numerical modelling was mentioned a lot, for example stress-strain analysis of German arch dam or numerical modelling of radial gates or new pipelines. Also numerical modelling of thermal loads of asphaltic concrete lining in Czech was mentioned. One case was about geotechnical problems in dam foundation in Canada and the last, from Sweden was about new attitude in project management (creating working group of designer and contractor from the beginning to the end of project).
- Sustainability and reservoirs (Elias, Christian)
  - The group consisted of people dealing with a mix of new dam construction and existing dams. All identified environmental sustainability as an ongoing challenge for dams. Some new dams are built off the river alignment, which can be helpful for reducing environmental impact. Some reservoirs produce methane due to decomposing matter, which is a greenhouse gas. Sedimentation and fish passage are also environmental issues for dams - while flushing and fish passage can be used they are not perfect solutions.
- Engineer from 25 to 40, from plan A to plan B (Florian)
  - For most of the attendees, it was plan A to become a dam engineer. Those, that became dam engineers as plan B, are happy with this. But people were also open minded, that a plan C can be necessary and that you can end up somewhere in the middle, like A-B or B-C. Changing from plan A to B seems not to be a question of age.
- Engineers without borders (Leila and Boris Martin)
  - The group discuss about the career purposes of Young professional. One of the main take away is that there is a need for young professional to be involved in the organization and in ICOLD technical Committee, in order to support the sustainability of the organization, and to avoid generational gaps. Finally, the group agreed on the fact that the world is changing and there is a need for adaptation, that should be reflected within ICOLD organization.

## 5 ELECTION OF NEW YEF BOARD MEMBERS

Three terms on the Steering Committee were expiring (including YEF chair) and one member stepped down, to be replaced by new members. This will maintain future board membership at 7 persons with either 2 or 3 being replaced annually. Priska H. Hiller (Norway, ICOLD-YEF chair 2016-2019) and Sam Tudor (UK) resigned from the board and a big thank you was given to them. The terms of Amanda Sutter and Elias Baptista also expired and they were re-elected for another term.

Four candidates were nominated for the steering committee: Elias Baptista (Mozambique) for the chair and Mateja Klun (Slovenia), Florent Bacchus (France), Amanda Sutter (USA) for regular board members.

Elected were: Elias Baptista (Mozambique) for the chair and Mateja Klun (Slovenia), Florent Bacchus (France), Amanda Sutter (USA) for regular board member.

The existing ICOLD-YEF Steering Group before voting was:

- Priska H. Hiller (Norway), Chair, 2016-2019
- Amanda Sutter (USA), 2016-2019
- Elias Baptista (Mozambique), 2016-2019
- Leila Ouahit (Canada), 2017-2020
- Sam Tudor (United Kingdom), 2017-2020
- Tim Ivanov (Russia), 2018-2021
- Giulia Buffi, (Italy), 2028-2021

The new ICOLD-YEF Steering Group after voting is:

- Elias Baptista (Mozambique), Chair, 2019-2022
- Amanda Sutter (USA), 2016-2020
- Leila Ouahit (Canada), 2017-2020
- Tim Ivanov (Russia), 2018-2021
- Giulia Buffi (Italy), 2018-2021
- Mateja Klun (Slovenia), 2019-2022
- Florent Bacchus (France), 2019-2022

## 6 OTHER BUSINESS & CLOSE

- Next YEF meeting in India 2020
- Encourage participation of YE in Technical Committees
- Join the YEF LinkedIn group, as we use it for distributing information
- Information about the Mentorship Opportunity and the YEF networking event.

Priska H. Hiller and Elias Baptista, Ottawa, June 12th, 2019

**Z) CAPACITY BUILDING AND DAMS  
(2017-2021)**

PROGRESS REPORT

Meeting in Ottawa, 11<sup>th</sup> June 2019

**Z) RENFORCEMENT DES CAPACITES AU SEIN DE LA  
CIGB  
(2017-2021)**

RAPPORT D'ACTIVITÉ

Réunion à Ottawa, 11<sup>er</sup> July 2019

MEMBERSHIP LISTE DES MEMBRES		MEETING Réunion	
COUNTRIES PAYS	MEMBERS MEMBRES	Present	Remarks
Burkina Faso	Adama NOMBRE, Chairman	YES	Excused
Morocco	Khalid EL GHOMARI Vice Chairman	NO	
Netherlands	Miroslav MARENCE Vice Chairman	YES	
Iran	Ali NOORZAD	YES	
Nigeria	Imo EKPO	YES	Excused
Spain	Jose POLIMON	NO	
Morocco	Abdelrahim EL GHISSASSI	NO	
Russia	Sergey YUREV	YES	
Co-opted	Jo-Anne PERRETT	YES	Excused
Canada	Clare RASKA	YES	
China	Feng JIN	YES	
Korea	Kyung Taek YUM	YES	
Australia	Mike RANKIN	YES	
Switzerland	Pedro MANSO	NO	
Nigeria	Femi SONUGA Secretary	YES	
Nigeria	Pamela DIBIA (Observer)	YES	
	Hitendra Dev Shakya (Observer)	YES	

**COMMITTEE Z on CAPACITY BUILDING (CBC)  
(2017-2021)**

Ottawa, Canada 8.30am, 11th June 2019

**Progress Report**

**1. AGENDA**

At the onset the proposed agenda was distributed and was ratified as the basis for the meeting and was treated under the following headings.

- 1) Committee membership and organization.
- 2) Progress of the on-going training programs at Morocco and China.
- 3) ICOLD Board's initiative to support capacity building in dam engineering.
- 4) Action Plan Implementation and Progress

**2. COMMITTEE MEMBERSHIP and ORGANIZATION**

**2.1 Admission of New Members:**

- Mike RANKIN representing Australia;
- Clare RASKA representing Canada.

**2.2 Co-opted Member**

Following Jo-Anne PERRETT's move to Australia her status was changed to Co-opted Member whilst Clare Raska becomes the new provisional representative for Canada.

**3. TRAINING PROGRAMS**

**China**

China had organized eleven Workshops and Technical Tours for leading professionals from Africa between 2008 and 2018. These have been very successful and are in high demand. The 12th CHINCOLD Workshop and Technical Tour will take place in November, 2019 in Kunming. The request for participants to the workshop for 2019 had been launched. The interested participants should contact their country association or the Committee directly.

**Morocco**

The last training program in Morocco was successfully held with trainees having the opportunity to participate in Africa 2017 conference. The Training Programme for this year would be launched immediately after the Annual Meeting.

**Turkey**

The new protocol for the Turkey training program is expected to be finalized in the coming months.

**Master’s Programme**

At the invitation of KNCOLD, the KOREA International Scholarship Program for KOICA-SKKU Master's Degree Program in Water Resources was announced earlier in the year and candidates had sent their application to KOICA.

**Short Courses**

CBC is continuously trying to arrange short courses with member countries which will involve some professionals from developed member countries holding training workshops in developing member countries. During the Africa 2019 Conference in Namibia co-organized by ICOLD and Aqua Media, CBC has organized a successful one day short course on Reservoirs and River yields evaluation in semi-arid and arid countries. Around 20 trainees attend the course.

**Exchange Programs**

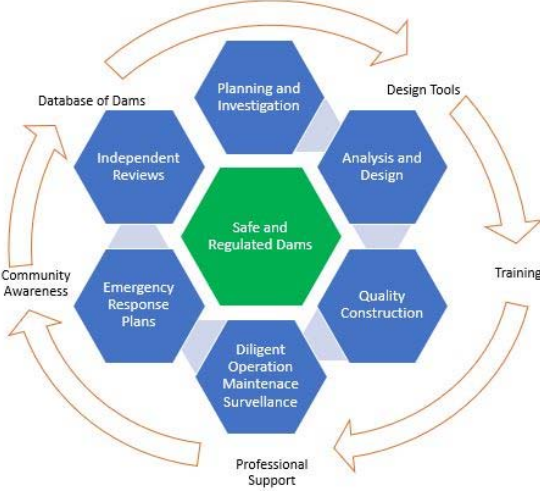
Due to the request by some members from developed countries, an exchange program that would highlight the different stages of dam construction is being planned with some of the developing member countries in Africa.

**4. PROGRESS on the CAPACITY BUILDING ACTION PLAN**

For ease of implementation the Action Plan was grouped into five main components viz:

The progress to-date is given in the following Table titled “Progress Report on the Implementation of the Action Plan”.

PROGRESS REPORT ON THE IMPLEMENTATION OF THE ACTION PLAN

ACTIVITY	Description	Responsible Members	Progress to date
<p>1. Preparation of Supporting Tools package for dams</p>	<p><i>The following graphic depicts the draft concept design of the Capacity Building Committee (CBC) action plan (AP). Safe and Regulated Dams are at the core of our AP. Our desired outcome is to achieve safe dams. To achieve this, there are many elements that must all be considered. To build capacity in all of those areas, we must provide design tools, training, professional support, build community awareness and ensure an up-to-date database of dams is available.</i></p>  <p><i>Preparation of a supporting tools package will comprise a bibliography of the following documents:</i></p> <ul style="list-style-type: none"> <li>- ICOLD Bulletins</li> <li>- Other technical guidelines / manuals that would supplement the bulletins</li> <li>- Sample forms and checklists</li> <li>- Brochures and pamphlets</li> <li>- Database of dams</li> </ul> <p><i>Each of the above will be sorted into one of the subject matter categories listed above.</i></p>	<p>Jo-Anne Perrett Sergey Yuriev El Ghomari</p>	<p>There are already many ICOLD Bulletins that represent State of the Art practices and the CBC have listed these as the “Principle Guidance Documents”.</p> <p>In addition, to supplement these, there are also excellent resources from Member Countries. Some of these have been listed (CDA, ANCOLD, FEMA, USACE) as “Supplementary Document”s but others may be added. In order to determine which are to be added, CBC will seek guidance from appropriate ICOLD Technical Committees as the subject matter experts.</p> <p>A draft outline of the concept for capacity building elements has been prepared and circulated amongst TC for comment.</p> <ol style="list-style-type: none"> <li><b>Undertake a consultation with National Committees to sort those who are interested to develop Dam safety Program in their countries and associate them to the process. I</b></li> <li><b>Preparation of Dam Safety Training Program with clear scope, objective interested public to be submitted for funding towards Agencies, Universities, and potential funding institutions in developing and developed countries</b></li> <li><b>Prepare also training programs related to others aspects of dam engineering such as planning, design, monitoring in the form of short courses which can be organized as side</b></li> </ol>

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			<p>event in ICOLD activity or regional event within the regional club events</p> <p>Pr FENG inform on the need of Experts with fluent English from CHINA for the translation into English of Chinese Codes and Standards in English to make these knowledge available for the profession</p>
<p>2. Assistance and Support to New ICOLD NATIONAL COMMITTEES through the development of a welcome package;</p>	<p><i>It was agreed that a <b>Welcome Package (Kit)</b> should be prepared for the New ICOLD National Members which would also give a few details and links.</i></p>	<p>Imo EKPO (Nigeria) Ali NOORZAD (IRAN) Abderrahim EL GHISSASSI (Morocco)</p>	<p>The CBC would work with the Central office to review/modify and finalize the Welcome Package (KIT) currently being prepared by the ICOLD central office.</p> <p>Several attempts have been made by members to encourage non-member countries to become members. Also, some of the non-active members have been approached to reinstate their membership and to become more active.</p>
<p>3. Continuation of the Existing Training Programs and the development of New Ones to also suit developed and developing Countries members;</p>	<p><i>The main problems of the New Training Programs was highlighted to be the lack of funds to run them. Therefore, short (3 to 5 day) courses with 1-2 lecturers (invited experts) and some local experts, is suggested as cost saving option. Additionally online lectures (before and after the course) could be prepared increasing the course efficiency. The course participants should be actively included in the course with assignments based on their real projects.</i></p> <p><i>It was discussed that the CBC should look at organizing regional workshops where members from adjacent countries could attend for a fraction of the costs than going elsewhere. It was also suggested that some of the retired ICOLD members could be co-opted to give their time for free. It was also agreed that some existing online courses should be reviewed to suit some of the needs of the members.</i></p> <p><i>For Europe and other developed countries, where Dam development has scaled down significantly it was suggested that exchange programs be adopted where participants from Europe can visit Dam Construction Projects in Developing countries and in return participants from less developed countries can visit the existing dams and see how they are operated and maintained.</i></p>	<p>Khalid EL GHOMARI (Vice Chairman) Jose POLIMON (Spain) Adama Nombre (Chairman) Femi Sonuga Pr FENG JIN V P YUM</p>	<p>China training programs for 2019 had been announced, awaiting nominations from National Committees.</p> <p>CBC is in the process of developing a template to assist capacity building initiatives between DEVELOPED and DEVELOPING nations. The template can also be used by development organizations in the planning of own initiatives.</p> <p>Master's Programs with sponsorship had been announced for South Korea but now closed.</p> <p>A survey will be made to make an inventory of capacity Building Possibilities and exploit them in the implementation of plan. Regional initiatives will be considered</p>

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	<i>A survey of initiatives currently on-going in Delft, Spain, Brazil is currently being reviewed to see the possibility of linking them to the CBC website. Also look into using ICOLD events to organize short courses similar to what Hydro conferences with the support of the AMIHP Foundation, similar to that at Africa 2019..</i>		
4. Interaction with Government Agencies and Multilateral Institutions;	<p><i>Considering the reduction in funding of a lot of the government run aid programs it was agreed that more efforts should be concentrated on the multilateral organizations. Inviting them to partner with ICOLD.</i></p> <p><i>We need to talk with World Bank, AfDB, Asian Investment Bank, European Cooperation, KOREA and others regional organization. There is a need to prepare a package of activities to discuss with the institution.</i></p>	<p>Miroslav MARENCE (Vice Chairman) Adama Nombre (Chairman) Khalil El GHOMARI (Vice Chairman) FEMI ( Secretary) V P YUM, Pedro Manso</p>	<p>ICOLD Board is currently negotiating with the World Bank for the capacity enhancement on Dam Safety for African countries. CBC is making contributions to the process.</p> <p>Based on the experience gained from the WB protocol, CBC will prepare a program covering the Project Cycle that can be used as a basis for future consultation with Multilateral agencies and similar.</p>
5. Capacity Building Section of the Website	<i>The Capacity Building Web Site should be developed and used as a tool for the dissemination of knowledge through the provision of on-line links to many resources. It should also be used for training through on-line courses.</i>	<p>Miroslav MARENCE Jose POLIMON, Pedro Manso</p>	<p>Discussions were held with the central office and the members list would be updated, each member of the committee would have access to the sharing platform.</p> <p>In coordination with topic 1, the web page (web accessible) will be prepared. The web page should give the structure of the bulletins and tools available from ICOLD as well as links to existing related short courses and programs. This will increase the visibility of the committee and also ICOLD.</p>