



# The History of the World Register of Dams

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## 1. Introduction

The World Register of Dams (WRD) is a fizzy fountain of information for design, construction, scientific work and statistical work and statistical evaluations. The last census includes more than 58.000 large dams according to the definition of ICOLD (height at least of 15 m above the foundation or above 5 m with a capacity above 3 million of m<sup>3</sup>). For each dam more than 40 statistical information are given, amongst them geographical data, data of the dam, the spillway, the reservoir, the responsible as well as important environmental data...

It is worth to look back to the first attempts of creating a worldwide register of large dams corresponding to the ICOLD criteria of such dams.

<sup>1</sup> Adapted from the original text by W. Flögl



## 2. First Edition

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**A**t the 25th Executive Meeting of the International Commission on Large Dams, held in New York in September 1958, it was decided to prepare a detailed register of all large dams which were storage dams with a height of 15 m or 50 feet from deepest foundation level to crest, according to the definition adopted by ICOLD in 1932.

In 1959 a special “Committee on the World Register of Dams” was appointed under the chairmanship of J. Guthrie Brown, Vice President of ICOLD, Great Britain.

Other members of the committee of 1959 were

- T. W. Mermel, USA
- D. José Toran Pelaez, Spain
- Niilo Saarivirta, Finland
- Yasushi Sugaya, Japan

It was realized that the value of the world register depended on having records of the greatest possible number of dams in each country, rather than a much smaller list of very high dams [1].

The first edition was published in early 1964 during the presidency of Claudio Marcello. It contained 9,315 dams, either completed on the 31. December 1962 or under construction or projected at the date. 17 information were foreseen for each dam, both in metric and Anglo American units of measurement. The data collection was carried out in 48 member countries of ICOLD at that time (tab. 1).



**Tab. 1: Editions and Updates of WRD**

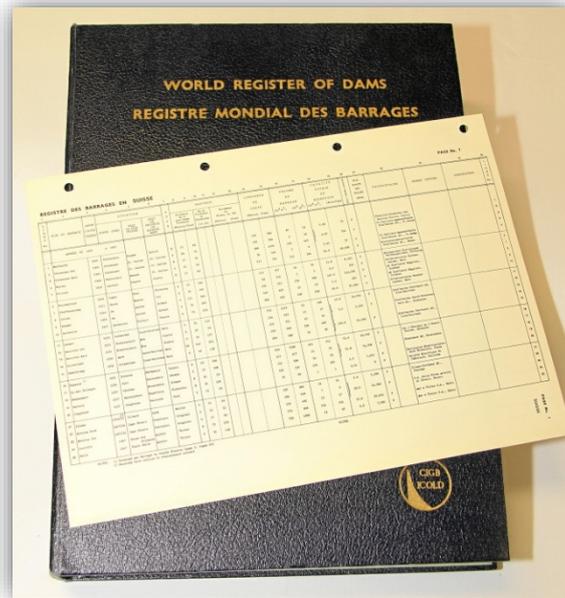
Edition Update	Year	Dead-line End of	Chairman	Committee Members Numbers	Numbers of Countries		Dam Data total
					Investigations in m.c./n.m.c.	New Data Reported by	
1 <sup>st</sup> edition	1964	1962	G. Brown/UK	5	48/-	48/-	9 315 <sup>(1)</sup>
1 <sup>st</sup> update	-	1965	T. W. Mermel USA	-	60/-	60/-	9 608 <sup>(1)</sup>
2 <sup>nd</sup> update	-	1968	T. W. Mermel USA	-	60/44	60/44	-
<b>Change of format</b>							
2 <sup>nd</sup> edition	1973	1971	T. W. Mermel USA	-	66/44	66/44	15 619 <sup>(1)</sup>
1 <sup>st</sup> update	1976	1974	T. W. Mermel USA	-	-	-	-
2 <sup>nd</sup> update	1979	1977	J. Vernisse/F J. G. du Plessis/SA	-	-	-	-
3 <sup>rd</sup> edition	1984	1982	J. G. du Plessis/SA	16	74/58	72/58	36 051 <sup>(2)</sup>
1 <sup>st</sup> update	1988	1986	J. G. du Plessis/SA	15	79/54	58/30	37 593 <sup>(2)</sup>
<b>Electronical register</b>							
4 <sup>th</sup> edition	1998	1996	F. Teixeira Direito/PT	15	80/60	60/34	25 410 <sup>(3)</sup>
1 <sup>st</sup> update	2003	2001	D. Bister/F	15	82/58	71/33	33 105 <sup>(3)</sup>
2 <sup>nd</sup> update	2011	2006	W. Flögl/AT	17	92/83	70/36	37 640 <sup>(3)</sup>
Last update	2018		P. Le Delliou/F	19	100/96	99/65	58 260

m.c.: member-countries  
n.m.c.: non-member-countries

- (1) no Chinese dams  
(2) Chinese dams > 15 m included  
(3) Chinese dams > 30 m included

The decision to adopt a loose-leaf-system of four volumes (Fig. 1) was taken so as to ensure that the record of dams could be kept up-to-date by including in the future further loose-leaf-pages of additional dams completed, under construction or in project.





(Fig. 1)

Any new countries that become members of ICOLD should be required to furnish particulars of their large dams so as to include this information in the volumes of the WRD.

The first update of the WRD which is included in the volumes of 1964 was published by the end of 1965, when 12 more countries had become members of ICOLD and approximately 1.350 new dams were included in the update.

In the second update 1968 large dams of 44 non-member-countries were included. It may be mentioned that the chairman Guthrie Brown became president of ICOLD in 1964 and T. W. Mermel took over chairmanship in the same year. He stayed chairman of the committee until 1976 and was responsible for the updates 1965, 1968 and 1976 as well as for the second edition 1973.

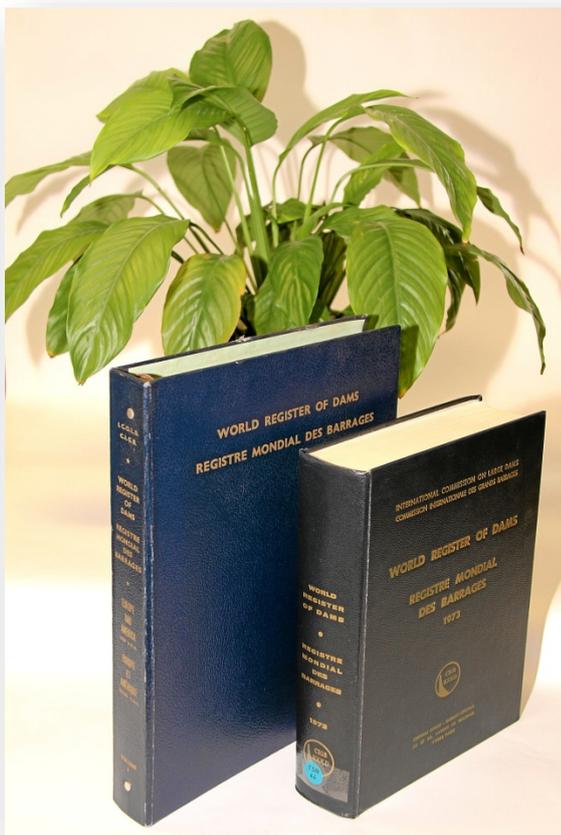
It also may be mentioned that the Secretary Generals and Central Office (C.O.) were always involved very much in the achievements of the registers.

The first edition of WRD led to a modification of the ICOLD constitution providing “that each National Committee undertake to compile and submit to the Central Office as soon as possible after admission to membership a register of large dams in its country” to add it to the WRD.



### 3. Second Edition 1973

The committee chaired by T. W. Mermel, USA, prepared the second edition of the register of dams by the end of 1971. It was possible to collect data in 66 member countries and 44 non-member countries.



A book of 1.000 pages was published in 1973 containing 15.618 dams (15.406 dams in member-countries (m.c.), 212 dams in non-member-countries (n.m.c.)). Data of dams in China were not available (see Tab. 1). The format of the book was changed (Fig. 2).

The metric system only was adopted.

To facilitate responses and preparations some data of secondary interest were omitted, information about type of dam, spillway type, the maximum discharge capacity of spillways were edited.

The number of information per dam decreased to 16.

In the first Update 1976 a table statistics for each member country was created, in the second updating (1979) classified tables were added which gave lists of dams in order in presidency on account of their height, type, volume or other interesting figures [3].

It may be mentioned that the second edition of WRD was published under the presidency of Josè Toran Pelaez who had been a member of the first committee on WRD.



## 4. Third Edition 1984

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**1**6 committee members, chaired by J. G. du Plessis, cared for data collection in 74 member countries and obtained further informations from 58 non-member countries by the end of 1982 (tab. 1). Three kinds of informations were added, namely the nature of the foundation, the type of position of the impermeable zone for embankment dams and surface area of the reservoir at full supply level. The number of information rose to 18.

The third edition contains information about 36.047 large dams in the world (in operation: 34.798 in member countries, 348 in non-member-countries, 901 under construction) although it is mentioned that international dams may appear twice (in each country).

Dams less than 15 m height (except “large dams” per ICOLD definition and dams constructed before 1900) were deleted off the register. For the four countries with more than 1.000 dams (China, Japan, India, USA), dams less than 30 m height appeared in the statistical tables only, but not in the folios.

For the first time each member of the committee was assigned a group of countries connected in some way with his own to promote accuracy and reduced work load on C. O. The first electronical national registers were created especially in countries with a large number of dams.

The first Update 1988 included all dams completed during the years 1983-1986 and dams under construction at the end of 1986. 37.589 dams are recorded (in operation: 36.563, under construction: 1.026).

In the following years several attempts were made to computerize the WRD. Finally a new computer programme was developed by C. O. (Secretary General J. Lecornu) in close interchange with the chairman F. Teixeira Direito and Vice chairman D. Bister of the committee on the WRD (1992-1998). The final result was achieved in 1996.



## 5. Fourth Edition 1998

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**T**he 15 committee members, chaired by F. Teixeira Direito, collected data of operational dams at the end of 1996 electronically. The full register was prepared on a disc. The “print section” of the new WRD 98 was seen basically as “a summary for those in a hurry”.

As a new information the purpose of dam was included in data collection. The Edition 1998 contained 25,410 dams although member countries reported 41,413 operational dams in 1996. The difference might have resulted by about 14,000 to 15,000 Chinese dams 15 to 30 m height, which were included in the reports but not in the WRD.

For the first update of the fourth edition which was published in 2003 and contains dam data until the end of 2001 five new fields were introduced to have some reliable data on benefits and concerns on large dams:

- Electric installed capacity
- Mean annual electric energy produced
- Irrigated area
- Volume of water stored for flood protection
- Number of people affected by resettlement

15 committee members, chaired by D. Bister, tried to get dam information data from 130 countries.

Due to complementary data given by USA (+ 3.000), China (+ 2.800) and other countries the first update contained dam data of 33.105 dams.

The second update of the fourth edition will be put on the web site and be published in 2011. Due to additional reports in the register by Canada (373 dams), China (478 dams), India (465 dams), Iran (366 dams), Japan (1.955 dams between 15 m and 30 m height), South Africa (199 dams) and other countries the number of registered dams has increased by 4.828 dams. Some countries reported less dams in the register than 2003, so the total number of dams in the Update 2006 is 37,640.



For the Update 2006 data collection has been extended to 175 countries or almost all countries of the world except countries which were not supposed to have dams, like Vatican State, San Marino, Monaco or Vanuatu etc. (tab. 1). Information about four countries were given not to have any dams according to ICOLD definition (Estonia, Kiribati, Malta, Somalia).

General deadline for the Update 2006 was 31.12.2006. All dams in operation or under construction at that time should have been recorded in the Update 2006. Due to very slow feedback – some countries sent their national updates just in late autumn 2010 – general deadline is exceeded in several national updates.

Final numbers and figures are given on ICOLD web site, in the printed version of the Update 2006 and on the attached CD. Due to the fact that China has reported in the register only dams higher than 30 m and that more than 14.000 dams between 15 m and 30 m should exist in China, the total number of dams according to ICOLD definition should be much higher.



## 6. After 2011

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Several important evolutions have occurred since 2011:

- a new definition of a large dam in the Constitution of ICOLD
- the abandonment of paper versions in favor of a powerful search tool on the website of ICOLD.
- a "continuous" update of the database on the website
- the integration, thanks to the considerable work of the Chinese Committee, of data concerning a very large number of dams between 15 and 30 m high, bringing the total number of dams in the register to more than 58,000.
- addition of data for more countries (for the 2018 version, the register concerns 99 member countries of IGBC and 65 non-members).
- the addition of additional descriptive fields (detailed type, altitude, coordinates).
- the creation of a code to unambiguously identify each dam, including the dams on the border between two countries.
- a more systematic communication on the progress of the register at the General Assembly of ICOLD.
- the official decision to include in the registry the mining waste rock dams



## 7. Conclusions

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**T**he world register of dams is of very high importance as well for ICOLD as for the national committees in member and non-member countries. It is one of the pillars of the international dam community and a show window to public. Its central importance for ICOLD is documented by the fact that three Presidents of ICOLD (Brown, Toran, Pircher) and nine Vice Presidents (Baba, Brown, de Mello, Flögl, Maurer, Pircher, Shen Chonggang, Toran, Walz) and several chairmen or secretary general of national committees have been members of the committee on the World Register of Dams.

For the next versions of WRD which should be published in 2014 or 2015, a new access to data collection has to be found and optimizations of the WRD have to be done, such as

- to improve the quality of the data.
- to search for possible links with other databases, including the ICOLD (by type of dam, accidents ...).
- to promote the World Register of Dams by all means.

