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The International Towing Tank Conference is a voluntary association of worldwide organizations that have responsibility for the prediction of hydrodynamic performance of ships and marine installations based on the results of physical and numerical modelling.

HISTORY

The origin of the International Towing Tank Conference was the meeting of the International Hydro-mechanical Congress held in Hamburg in 1932. One of the consequences of this meeting was the decision to maintain, in alternate years, meetings under the name of "The International Conference of Ship Tank Superintendents". The original idea was to promote the improvement of all aspects of ship model work and to reach agreement on basic procedures and methods of presentation of results for publication. The first Conference of Tank Superintendants was held in The Hague in 1933, the second took place in London in 1934, the third in Paris in 1935 and the last, before the Second World War, in 1937 in Berlin. After the war, the Conference was resumed, starting with the fifth Conference held in London in 1948.

To give continuity from one Conference to another, the 5th Conference appointed a "Standing Committee", and agreed that the chairman would be the representative of the country arranging the next Conference. It was in the next Conference celebrated in Washington in 1951 when the Standing Committee suggested that a three year interval between the Sixth and the Seventh Conference would be desirable. From then on every three years the Conference has taken place.

It was in the Washington Conference when the suggestion of changing the name was given. For this reason, the Scandinavian Management Committee formed to organize the seventh conference in Oslo in 1954 proposed a change of the name to "International Conference on Ship Hydrodynamics" to the Standing Committee. The name was adopted and was thoroughly used during the seventh conference. However, the Conference did not accept this name, but adopted instead the name "International Towing Tank Conference" for future conferences.

At the 24th Conference held in Edinburgh in 2005, a major revision of the ITTC rules was adopted. Among others, ITTC introduced a general membership fee to cover running costs of the secretariat.

The International Towing Tank Conferences were held as follows:

ITTC	Dates of Meeting	Venue	No. of delegates	No. of Observers	No. of Countries	No. of Organisations
1st	July 13-14 1933	The Hague	23		9	16
2nd	July 10-13 1934	London	25	6	11	20
3rd	Oct. 2-4 1935	Paris	19		8	13
4th	May 26-28 1937	Berlin	29		10	18
5th	Sept 14-17 1948	London	46	4	7	24
6th	Sept 10-15 1951	Washington	68	17	13	44
7th	Aug 19-31	Scandinavia	77	7	17	
8th	Sept 15-23 1957	Madrid	93	6	21	58
9th	Sept 8-16 1960	Paris	85	3	19	55
10th	Sept 4-11 1963	Teddington	88	13	22	59
11th	Oct 11-20 1966	Tokyo	97	15	18	66
12th	Sept 11-20 1969	Rome	172		23	91
13th	Sept 4-14 1972	Hamburg & Berlin	134	50	25	71 (80)*
14th	Sept 2-11 1975	Ottawa	109	35	24	67 (71)*
15th	Sept 3-10 1978	The Hague	152	61	31	82 (71)*
16th	Aug 31- Sept 9 1981	Leningrad	166		26	86 (77)*
17th	Sept 8-15 1984	Gothenburg	209	59	32	92 (81)*
18th	Oct 18-24 1987	Kobe	223		25	93 (83)*
19th	Sept 16-22 1990	Madrid	235		32	158 (94)*
20th	Sept 19-25 1993	San Francisco	213		36	175 (107)*
21st	Sept 15-21 1996	Bergen & Trondheim	186		27	99 (109)*
22nd	Sept 5-11 1999	Seoul & Shanghai	184		26	96 (112)*
23rd	Sept 8-14 2002	Venice	217		28	96 (112)*
24th	Sept 4-10 2005	Edinburgh	194	65	26	
25th	Sept 14-20 2008	Fukuoka	248		26	102
26th	Aug 28- Sept 3 2011	Rio de Janeiro	212	82	24	70

(Notes)

Numbers refer to delegates and organizations who attended and do not include those who were invited but did not attend.
Number of organizations refers only to delegates attending the Conference and does not include observers.
* denotes the total number of ITTC Member Organizations
This Table is based on information from the paper “The ITTC from the 1st to the 21st Conference - Coming of Age” by B. Bowden, which was presented on May27, 1997 during his visit to KRISO.

EVOLUTION OF ITTC TECHNICAL COMMITTEES

David Murdey, June 2014

Early days

From the first Conference in 1933 of what was be to become the ITTC, up until the fifth Conference in 1948, technical sessions were comprised of presentations of papers by individual delegates. The first mention of technical committees is contained in the recommendations following the fifth Conference in 1948 when committees were set up to address Cavitation, Propeller and Skin Friction (later renamed Resistance). Seagoing qualities of ships and Presentation of Resistance and Propulsion Data were added in 1954. The "subjects to be considered by the Conference", and the corresponding technical committees were chosen by the Standing (Executive) Committee. Technical sessions comprised a summary, usually by the Chairman of the committee and extensive contributions from ITTC members.

1960 to 1993

The five technical committees from 1954 continued through 1960: Resistance, Propulsion, Cavitation, Seakeeping and Presentation (using their modern names) and in 1960 Manoeuvring was added to give a total of six.

1963 saw the approval by the Conference of a "Proposed Organization of the ITTC drafted by the Standing Committee" (later Executive Committee). This document contains a section describing the role and membership of technical committees and is very similar to the corresponding paragraphs in the Rules today. At the 1969 conference in Rome, the ITTC, as a body, authorized the reorganization of the ITTC which resulted in establishment of the Advisory Council in 1972. The prime role of the Advisory Council was (and still is) to recommend to the Executive Committee the subjects to be considered by the Conference. The Advisory Council took an increasingly important role in discussions concerning technical committees. From 1978 onwards, decisions on technical committees were being made by the Advisory Council with final approval by the Executive Committee.

The technical committees from 1948 to 1993 are listed in Table 1. In the table only years in which committees were changed are shown. The number of technical committees and groups steadily increased over the years to reach 12 in 1993.

Prior to 1978 reports of technical committees comprised a short summary by the chairman followed by a number of appendices written by committee members. Although the intent was for the report to be a consensus of the whole committee, achievement of this depended on the committee chairman. There were one or two controversial committee reports presented to the 1975 Conference which resulted in a change, starting in 1978, for the committees to produce a single document which reflected the opinion of the whole committee.

Groups

The term group was first used in 1984 to describe the Information Committee (successor to the Presentation Committee). The definition of a group as a committee set up by the Executive Committee to carry out specific tasks which are not technical issues was not included in the Rules of ITTC until 1996. Only two groups, Symbols and Terminology, which evolved from the earlier Presentation Committee, and Quality Assurance have been in place for more than one ITTC Period.

New Committee Structure 1996

By the 1990s the technologies used in model testing were changing rapidly and the use of computational methods was becoming widespread. At the same time demands on ITTC members by its clients were becoming more stringent. The Advisory Council was of the opinion that these changes would continue. The ITTC had been justifiably criticized for taking too long to respond to changes. The work of the technical committees for the next ITTC period was being proposed by the committees themselves, which led to an emphasis on long-term, on-going research. Over the years extra committees had been added, but apart from the short lived Secretariat Group, none had been discontinued. This resulted in an ever larger number of committees working in traditional areas. The Advisory Council was also concerned that any further increase in the number of committees, without a corresponding closure of some committees would increase the cost of holding the conference and make it difficult for member organizations to provide members on the committees.

The question was raised if the committee structure which had developed was the best one for the future. The work of the ITTC was being driven to a large extent by the committee structure. What was needed was a committee structure which would be flexible and enable the ITTC to respond to the the changing demands of its work.

To help provide answers the AC struck an Ad hoc Group to look at how other organizations, such as the ISSC and IAHR set up their technical committees. The Group found that although there were differences between the size and scope of the comparable organizations they had in common a structure which involved ongoing general committees and short term specialist committees, set up to address specific issues over a short period of time. This structure had three major benefits:

> Flexibility. The committee structure could be easily changed to ensure that it met the changing demands of the work.
>
> Quicker response to new issues. New committees could be set up to focus on specific issues and could be disbanded after three years.

Ability to maintain valuable outputs from the ITTC. There was a concern that the state-of-the-art reviews and critical bibliographies would continue to be produced.

General committees would be responsible for a general subject area, would review the state-of-the-art, identify needs of research and development and carry out longer term studies with broad impact. General subject areas were areas in which a majority of ITTC members have a direct interest. The number of general committees was intended to be small to allow resources to be allocated to the new specialist committees.

Specialist committees were to focus on a specific technical problem and would be set up for a limited duration. They would be expected to complete their work within in one or two ITTC periods, 3 to 6 years and would be disbanded at the end of this period unless action was taken to extend them. Specialist committees were to interact closely with the appropriate general committee. Both types of committee were to occupy the same level in the organization.

The Advisory Council accepted the Ad hoc group's recommendations and asked the group to prepare a draft new committee structure based on general and specialist committees. The new structure was agreed by the AC and terms of reference developed for each committee which were subsequently approved at the 1996 Conference.

Four general committees and eleven specialist committees were proposed. Each specialist committee had a duration of 3 years. The two groups, Quality systems Analysis and Symbols and terminology continued.

The committees are listed in Table 2.

It was expected that many of these proposed specialist committees would not get sufficient support to be viable, and would be dropped. In the event the Conference in 1996 supported all the specialist committees by proposing and supporting members.

1996 to 2014

The total number of committees (including the groups) has dropped from 17 in 1996 to 13 in 2014. The number of specialist committees dropped from 11 down to as low as 6 in 2011 and 2014. Although the total number of committees remained almost as high as in 1993, there has rarely been any difficulty in finding members for the committees.

Between 1996 and 2014 specialist committees have been set up to work in 33 different subject areas. As can be seen from their names in Table 2, they covered a wide range of topics. Some topics which were completely new to ITTC, for example to explore the possible role of the ITTC in ocean environmental issues. Others focused a specific topic within a general area which required more resources than would be available in a general committee. A few specialist committees continued to work on the same topics from one ITTC period to the next with a slightly changed name. These committees are shown in the table as continuations of the same committee. The ice committee has remained a specialist committee, with new terms of reference every three years (except for 2008) but under the same name Because the work of the ice committee is of direct interest to only a few ITTC members, it was not considered appropriate to be a general committee.

There were few changes to the general committees. (General committees were not intended to be permanent, but could change over time as to meet changing needs of ITTC member organizations). In 2002 the Loads and Responses committee was split back into Seakeeping and Ocean Engineering because it was found that although solving the problem of overlapping between these two areas, individual members did not have sufficient expertise in both moving ships and stationary structures in waves to take full advantage of this. In 2011 the Stability Committee which had been in existence as a specialist committee for five ITTC periods, was changed to a general committee “for the time being.”

The Symbols and Terminology group was discontinued in 2002, but much of the work in this area was included in the QA group in 2011.

From 1996 the Advisory Council has been responsible for identifying the technical topics needed to be addressed by the ITTC, setting up committees required to carry out the work effectively and drafting terms of reference. The terms of reference are drafted taking into account input from the technical committees, ITTC members at large and the expertise and priorities of Advisory Council members themselves.

Table 1 ITTC Technical Committees and Groups 1948 to1993

Year created. Years when there was no change are excluded	**1948**	**1954**	**1960**	**1963**	**1978**	**1981**	**1984**	**1987**	**1990**	**1993**
Technical committees										
Propeller	x	x	x	x	x	x	x	x	x	x
Cavitation	x	x	x	x	x	x	x	x	x	x
Resistance	x	x	x	x	x	x	x	x	x	x
Seakeeping		x	x	x	x	x	x	x	x	x
Presentation*		x	x	x	x	x				
Manoeuvring			x	x	x	x	x	x	x	x
Performance				x	x	x	x	x	x	x
Ocean Engineering					x	x	x	x	x	x
Ice					x	x	x	x	x	x
High speed craft						x	x	x	x	x
Waterjets										x
Groups										
Symbols and terminology*							x	x	x	x
Secretariat								x		
Quality control									x	x
*Name changed to Information in 1975 and Symbols and terminology in 1987										
Changed from a technical committee to a group in 1984.										
Total number of committees and groups	**3**	**5**	**6**	**7**	**9**	**10**	**10**	**11**	**11**	**12**

Table 2 ITTC Technical Committees and Groups 1996 to 2014

Year created	1996	1999	2002	2005	2008	2011	2014
General committees							
Resistance	x	x	x	x	x	x	x
Propulsion	x	x	x	x	x	x	x
Seakeeping			x	x	x	x	x
Manoeuvring	x	x	x	x	x	x	x
Ocean Engineering			x	x	x	x	x
Stability in Waves						x	x
Loads and responses	x	x					
Specialist committees							
Energy saving methods							x
Hydrodynamic modeling of marine renewable energy devices						x	x
Environmental modeling	x						x
Ships in service						x	x
Hydrodynamic noise						x	x
Ice	x	x	x	x		x	x
CFD in marine hydrodynamics					x	x	
Detailed flow measurement techniques					x	x	
High speed craft					x		
Scaling of wake field					x		
Surface treatment					x		
Uncertainty analysis				x	x		
Vortex induced vibrations				x	x		
Stability in waves/capsizing	x	x	x	x	x		
Wake fields				x			
Cavitation				x			
Azimuthing podded propulsion			x	x			
Powering performance prediction			x	x			
Assessment of ocean environment issues			x				
Cavitation of propellers and appendages on high speed ships			x				
Validation of waterjet test procedures	x	x	x				
Procedures for resistance, propulsion and propeller open water tests		x					
Water quality and cavitation		x					
Waves		x					
Stationary floating systems		x					
Esso Osaka		x					
Cavitation induced pressures	x	x					
Trials and monitoring/speed and power trials	x	x					
Unconventional propulsors	x						
Computational methods for propeller cavitation	x						
Deep water mooring	x						
Safety of high speed marine vehicles	x						
Model tests of high speed marine vehicles	x						
Groups							
Symbols and terminology	x						
Quality systems	x	x	x	x	x	x	x
Number of General committees	**4**	**4**	**5**	**5**	**5**	**6**	**6**
Number of Specialist committees	**11**	**9**	**7**	**8**	**8**	**6**	**6**
Number of Groups	**2**	**1**	**1**	**1**	**1**	**1**	**1**
Total number of committees and groups	**17**	**14**	**13**	**14**	**14**	**13**	**13**