STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
18	**NORWAY**	**2016-08-03**

A. ELECTRICAL INSTALLATIONS OF SHIPS AND OF MOBILE AND FIXED OFFSHORE UNITS

A.1 SCOPE

To prepare standards for electrical installations and equipment of ships and of mobile and fixed offshore units, incorporating good practice and aligning as far as possible existing regulations and IEC Publications.

The standards will chiefly concern:

a) factors promoting the safety of ships and of mobile and fixed offshore units;

b) factors promoting safety of life.

The standards will form a code of practical interpretation and amplification of the requirements of the International Convention on Safety of Life at Sea, a guide for future regulations may be prepared by Administrations, and a statement of practice for use by builders and appropriate organizations.

The standards will also foster interchangeability of parts and ease the selection and procurement of equipment, including cables for transport of energy, signals and data, by indicating, as appropriate, IEC standards of ratings, types, dimensions, materials, quality, test methods, etc., whether or not these are influenced by regulations, and will thus facilitate interchanges between purchaser and supplier.

A.2 DATE OF ESTABLISHMENT OF THE TECHNICAL COMMITTEE AND A BRIEF HISTORICAL BACKGROUND

The IEC Committee of Action, during its meeting in Bellagio in 1927, decided to nominate a specific Advisory Committee to study the questions relating to the standardization of electrical installations in ships.

This decision was taken as a result of a proposal made by the Netherlands National committee to undertake the study. The British National committee was asked to act as Secretary and the President was authorized to designate the National Committees to be invited to take part in the work.

A.3 CURRENT TITLE, SCOPE AND SUB-COMMITTEE

TC 18, Electrical installations of ships and of mobile and fixed offshore units, is responsible for standardisation of electrical installations for ships and mobile and fixed offshore installations. The work is done within the main committee and one subcommittee.

SC 18A, Electric cables for ships and mobile and fixed offshore units, is responsible for construction and performance standards related to electric cables for ships and mobile and fixed offshore units.

B. **MANAGEMENT STRUCTURE**

Secretariat: Norway	**Chair:** United Kingdom
Subcommittees	
SC 18A	Electric cables for ships and mobile and fixed offshore units
Advisory Groups	
AG 27	CAG - Chairman's advisory group
Joint Working Groups	
JWG 28	Utility connections in port
JWG 31	Subsea electrical power equipment and systems
Maintenance Teams	
MT 2	Maintenance team in charge of IEC 60092-101, -301, -302, -303, -304, -305, 306 and -307
MT 3	Maintenance Team in charge of IEC 60092-502
MT 6	Maintenance team in charge of IEC 60092-201, -202, -401, -503 and -504
MT 18	Maintenance of IEC 61892 Series of standards
MT 22	Maintenance Team in charge of IEC 60092-507
MT 24	Maintenance Team in charge of IEC 60092-501
MT 25	Maintenance team in charge of IEC 60092-506
MT 29	Maintenance Team in charge of IEC 61363-1
MT 30	Maintenance team in charge of IEC 60092-509
Project Teams	
MT 21	Maintenance Team in charge of IEC 60533
PT 62742	Electrical and electronic installations in ships - Electromagnetic compatibility - Ships with a non-metallic hull
Working Groups	
WG 33	Primary d.c. distribution system design architecture

C. BUSINESS ENVIRONMENT

In economic terms the investment in the electrical equipment and installation on new ships continues to increase as a percentage on the overall value of the vessel.

Ship owners, builders, insurers and other authorities are interested in consistent standards for electrical installations and shipboard cables, IEC 60092 series of standards, as well as other standards prepared by TC 18 satisfies this requirement.

For offshore units, there is a trend towards more complex installations, often combining both production and storage facilities, as in the so called Floating Production, Storage and Offloading Facilities (FPSO).

In addition to ships, the offshore industry is also now going into arctic areas, this is presenting special challenges with regard to the environmental conditions.

At the request of the offshore industry TC18 has prepared a separate standard specifically for the international offshore industry, IEC 61892.

It should be noted that TC18 has established a formal relationship with the International Maritime Organisation (IMO) with the scope to collaborate with this Organization in the field of electrical systems on board of ships and offshore units.

Equipment manufacturers include both big multinational companies as well as many international and national small and medium sized companies.

Ship/offshore cables are developed and produced by both big multinational companies as well as many international and national small and medium sized companies.

The major ship yards are located in China, South Korea and Japan for bulk carriers, LNG, FPSO etc, while passenger vessels mainly are manufactured in Europe (Italy, Germany, Finland, France).

There is a tendency to more and more specialisation of the yards, most of the large cruise ships are built in European yards. Norwegian yards are building specialized offshore supply and anchor handling vessels.

Offshore production platforms are normally built at a yard not too far from the location where the platform shall be installed while mobile drilling units and FPSOs are built at yards specialising in this type of units.

Currently technical experts from 18 countries are participating in the work of TC 18, while technical experts from 16 countries are participating in the work of SC 18A.

For cables, the estimated worldwide market in 2010 was approximately 800 M€. The worldwide segmentation is closely linked to standards. It is mainly shared between IEC and JIS (Japanese) standards for commercial vessels, while the offshore market is driven by IEC, NEK (Norwegian), IEEE and BS standards.

Worldwide market, value of equipment and installations, exclusive cables, for 2008: Approximately 18 000 M€.

D. MARKET DEMAND

The IEC 60092 series of standards for which TC18 is responsible is referenced in the International Maritime Organisation - Safety of Life at Sea Convention (SOLAS) and IEC 61892 is a referenced document in the Code for Mobile Offshore Drilling Units (MODU Code).

SOLAS is applicable to all commercial seagoing ships of 500 gross tonnes and above, thus the standards are used extensively internationally. For commercial ships below this level the mandatory requirements for electrical installation are usually set by the National Flag State Authority where the ship is registered. Many such Authorities world-wide rely on the IEC 60092 standards in preference to developing their own standards.

The IEC 60092 series of standards, and to some extent the IEC 61892 series are employed world-wide by naval architects, marine engineering design and consulting companies, design houses, ship and offshore unit builders, cable manufacturers, electrical equipment manufacturers, installers, classification bodies, test houses, ship owners, operators and national and international authorities.

The TC and SC have representation from most of the industries and authorities that they serve. Obtaining participation on the committee and working groups is not easy.

The standards are used for supporting regulations and as basis for contracts, and often replace the Statutory Authority documents.

In US, competing standards for equipment / materials are developed by Underwriters Laboratory (UL), National Electrical Manufacturers Association (NEMA), American Society for Testing and Material (ASTM) and American National Standards Institute (ANSI). Competing standards for installations on ships and mobile and fixed offshore units are primarily developed by the Institute of Electrical and Electronics Engineers (IEEE). In additions standards for installations on mobile and fixed offshore units are developed by the American Petroleum Institute (API).

As technology continues to advance there will remain a need for the TC/SC to produce new standards and to maintain the existing ones.

International oil companies are requesting standards for subsea electrical equipment. IEC TC 18 and IEEE PCIC 1886 have entered into an agreement for preparing standards for subsea equipment.

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

E.1 Technology

As the electrical power requirements of modern ships continues to increase, there is a trend to higher operating voltages for power consumers, propulsion and machinery auxiliaries. Reliable semiconductor devices in power electronics are rapidly changing the way marine and offshore power systems can be designed and operated.

Currently the most important technical developments in the shipbuilding and offshore industry relate to the increasing extensive use of computer hardware and software control and monitoring systems resulting in distributed machinery control and the introduction of additional and more sophisticated passenger/crew safety systems including addressable fire alarm and low level lighting systems, also passenger and crew address systems. Problems are already being seen with complex systems on board vessels where the advances in complexity have outstripped the ability of the builders and operators to understand and deal with the systems installed.

There is also an increasing awareness of the dangers of fire and the consequences of fire spread and the dangers of smoke products. For these reasons, fire performances as Flame Retardancy, Fire resistance, Low smoke, No corrosivity, Halogen free materials are more requested, both for electrical equipment and for cables.

There is a growing awareness of the effects of electromagnetic interference and much discussion and effort is going into the development of comprehensive EMC standards.

The shipping industry is experiencing a return to electric propulsion systems which has resulted from the development of power electronics. A move to variable speed auxiliary drives is also being seen for the same reasons.

Energy efficiency with the purpose of reducing greenhouse gas emissions from ships is under discussion within IMO. This may lead to more efficient power generation and distribution systems. Hybrid solutions will require improved and modified standards. TC 18 will maintain a lead role initiative and develop technical recommendations for d.c. primary distribution in marine units.

In the offshore industry there is a trend to use variable speed drives (VSD) for supply of large turbines and compressors, instead of using gas turbines. The use of subsea equipment is becoming common. This is a special challenge as few, if any, standards are available for such equipment. The end users are especially discussing standards for high voltage penetrators and connectors, subsea power transformers, subsea high and low voltage switchgear and subsea high voltage variable speed drives.

Fibre optics is becoming common. However, neither TC 18 nor SC 18A have developed any standards dealing with fibre optics, but their use is referenced in several TC 18 publications. Photo voltaic technology is becoming more common for use on unmanned platforms and other offshore structures. This will be considered in the revision of IEC 61892 series.

Most of technical comments above apply equally to offshore units including the requirements of SOLAS in respect of some mobile units.

E.2 Market

The trends in shipping are to a continuance of the current ship types coupled with the introduction of larger container and passenger ships, the introduction of high speed vessels of a variety of types and sizes with the accompanying requirements for reduction in weight of all installed machinery and systems including the electrical installation.

For the offshore market, there is a considerable interest in supply ships with dynamic positioning.

Fuel cells and various energy storage technologies are being introduced, especially for hybrid systems.

For ferries, especially on short routes, battery systems are being introduced. Due to short stops, charging of the batteries can be a challenge as the capacity of the onshore grid may not be sufficient in order to allow rapid charging. This can be solved by battery packs onshore, which are rapidly discharged and charges the battery on the vessel, during the short quayside stop for the ferry.

The increase in the size of vessels and of the installed electrical load is leading to the use of higher voltage systems. The return to electric propulsion systems coupled with the advances in solid state power devices and the need for variable speed auxiliary drives has lead to more strict control of EMC which is reflected in the extensive updating of the TC’s EMC standard.

The offshore industry is moving towards arctic areas, and this is causing new challenges, especially with regard to the environmental conditions. The tendency to power supply from shore and development of projects with installed power more than 150 MW, as e.g. for floating LNG units may require new

standards. These powers may also require a higher voltage than the current 15/35 kV limits and new work to cater for such voltages has been undertaken for the IEC 61892 series and will be considered for the IEC 60092 series.. Sub-sea installations are becoming more frequent.

E.3 Ecological environment

TC18 is primarily concerned with the installation of electrical equipment, the ultimate disposal of the installation on board the ship or offshore unit is beyond the scope of the committee. However, TC 18 is aware that laws in different countries focus on the restrictions on the usage of hazardous materials, substances and processes.

SC18A is primarily concerned with the manufacturing of shipboard and offshore cables.

However, the committees are conscious of the need to protect the environment and thus strive to ensure that the materials employed in the installations are ecologically friendly and cause the minimum of pollution possible.

In order to reduce pollution when ships are in port, there is a trend toward supplying ships from shore when in port. TC 18, in cooperation with ISO TC 8/SC 3 and IEEE (PCIC) P1713 is preparing standards for shore supply, both for high and low voltage.

In order to reduce the pollution some offshore production fields are now supplied with power from shore, instead of using locally generated power by means of gas turbines.

F. SYSTEM APPROACH ASPECTS (REFERENCE - AC/33/2013)

TC 18 wil actively continue to promote the establishment of liaisons to other committees; cooperation with system committees is still our focus.

System Committees (TC 18 as a supplier of standards)	None	
Product Committees (TC 18/SC 18A as a customer of standards)	TC 2	Rotating machinery
	TC 17	Switchgear and controlgear
	SC 17C	High-voltage switchgear and controlgear assemblies
	TC 20	Electric cables (relevant for SC 18A)
	TC 21	Secondary cells and batteries
	SC 21A	Secondary cells and batteries containing alkaline or other non-acid electrolytes
	SC 23H	Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles
	TC 27	Industrial electroheating and electromagnetic processing
	TC 31	Equipment for explosive atmospheres
	SC 31J	Classification of hazardous areas and installation requirements
	TC 34	Lamps and related equipment
	SC 34A	Lamps
	SC 34B	Lamp caps and holders
	SC 34C	Auxiliaries for lamps
	SC 34D	Luminaires
	TC 64	Electrical installations and protection against electric shock
	TC 77	Electromagnetic compatibility
	TC 80	Maritime navigation and radiocommunication equipment and systems
	TC 121	Switchgear and control gear and their assemblies for low voltage
Other Committees (horizontal committees that produce standards used by TC 18)	TC 70	Degree of protection provided by enclosures
	TC 104	Environmental conditions, classification and methods of test

Active cooperation established:

- Liaison officers from SC 31J, participating in TC 18 maintenance team
- Liaison officer from TC 18 participating in SC 31J maintenance teams

G. CONFORMITY ASSESSMENT

The standards published by TC18 are currently not used for conformity assessment by any of the IEC certification schemes (IECEE, IECEx, IECQ, IECRE)

The TC 18 standards contain some test requirements and may potentially be used for conformity assessment.

H. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
Prepare a more user friendly set of standards for ships	- Revise all standards in the 60092 series taking into account the System Approach Philosophy	- Target date: 2020
Reduce the time to develop TC 18 deliverables and improve the consistency of the content	Chairman or Secretary to participate in MT/PT meetings Convenors to report to Secretary after each meeting and file MOM at the Collaboration tool website	Target date: 2017
Increase awareness of TC 18 publications	Marketing form to be completed by convenors. To be sent Central Office when closing of FDIS voting. Hold a seminar in conjunction with the Plenary meeting to raise awareness with local industry.	2016
Identify areas where IMO energy efficiency proposals will impact on the currently published standards and initiate work programs to deal with these.	Follow closely the work of IMO and propose changes to existing standards or new ones, if necessary	Target date: 2018
	Develop a PAS for DC-distribution systems, which will allow for the efficient connection of battery systems	Target date: 2016
	Develop a standard for DC-distribution systems, which will allow for the efficient connection of battery systems	Target date: 2018

I. USEFUL LINKS TO THE IEC WEB SITE

TC 18 home page

TC 18 work programme

SC 18A home page

IEC directives

Name and signature of the secretary

Arild Røed