



RP 59-8

TELECOMMUNICATIONS

SELECTION AND USE OF TEMPORARY TELECOMMUNICATIONS SYSTEMS FOR OFFSHORE INSTALLATION PROJECTS

June 1994

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BP GROUP RECOMMENDED PRACTICES AND SPECIFICATIONS FOR ENGINEERING											
Doc. No. RP 59-8		Issue Date	June 1994								
		Latest Amendment Date									
Document Title											
TELECOMMUNICATIONS SELECTION AND USE OF TEMPORARY TELECOMMUNICATIONS SYSTEMS FOR OFFSHORE INSTALLATION PROJECTS											
APPLICABILITY - Does not preclude adaptation for other applications Regional Applicability: North Sea											
SCOPE AND PURPOSE This Recommended Practice provides guidance on the selection and use of Temporary Telecommunications Systems for offshore installation projects. Its purpose is to provide design engineers and management with:- (a) Guidance on the need for and selection of temporary telecommunications systems for offshore installation projects. (b) A basis for designing, specifying, evaluating and selecting temporary telecommunications systems for offshore installation projects. (c) Guidance on the safety aspects associated with the design and selection of temporary telecommunications systems for offshore installation projects.											
AMENDMENTS <table border="0"> <thead> <tr> <th align="left">Amd</th> <th align="left">Date</th> <th align="left">Page(s)</th> <th align="left">Description</th> </tr> </thead> <tbody> <tr> <td colspan="4"> </td> </tr> </tbody> </table>				Amd	Date	Page(s)	Description				
Amd	Date	Page(s)	Description								
CUSTODIAN (See Quarterly Status List for Contact) Control & Electrical Systems											
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FOREWORD

Introduction to BP Group Recommended Practices and Specifications for Engineering

The Introductory Volume contains a series of documents that provide an introduction to the BP Group Recommended Practices and Specifications for Engineering (RPSEs). In particular, the 'General Foreword' sets out the philosophy of the RPSEs. Other documents in the Introductory Volume provide general guidance on using the RPSEs and background information to Engineering Standards in BP. There are also recommendations for specific definitions and requirements.

Value of this Recommended Practice

There is currently no formal document in existence covering the provision of Temporary Telecommunication Systems services. Future applications will benefit from the ability to specify and procure such systems using resources from within or external to the BP Group in a speedier and more cost effective manner. It is intended that this Recommended Practice will stimulate standard offerings to emerge and these will produce cost benefits compared with current bespoke systems.

Application

Text in *italics* is Commentary. Commentary provides background information which supports the requirements of the Recommended Practice, and may discuss alternative options.

This document may refer to certain local, national or international regulations but the responsibility to ensure compliance with legislation and any other statutory requirements lies with the user. The user should adapt or supplement this document to ensure compliance for the specific application.

Feedback and Further Information

Users are invited to feed back any comments and to detail experiences in the application of BP RPSE's, to assist in the process of their continuous improvement.

For feedback and further information, please contact Standards Group, BP International or the Custodian. See Quarterly Status List for contacts.



1. SCOPE

1.1 Inclusions

This Recommended Practice provides guidance on the need for selection and implementation of temporary telecommunication facilities to support offshore installation projects. It covers:-

- (a) Why temporary telecommunication facilities are required.
- (b) The type of services that may be needed.
- (c) An outline of the tasks needed to ensure project timescales are met.

1.2 Exclusions

The following are not covered by this Recommended Practice:-

- (a) Detailed planning, design and installation practices.
- (b) Country specific information.

This Recommended Practice is restricted in applicability to offshore projects because the characteristics for other types of temporary telecommunications required to support onshore installation can vary in size, capacity and regulatory requirements.

2. EXPOSITION

2.1 Telecommunications

In terms which are generally accepted, Telecommunications is defined as the transportation of voice, image, text or data between physically separated points. To achieve this function, electronic devices predominate, with either cable or radio connections being employed to implement the physical interconnections. Optical technology is however being used in an increasing number of applications, particularly in the field of optical fibre cables.

2.2 Telecommunications Systems

Within the definition of this Recommended Practice, a Telecommunications System is defined as a collection of individual items of equipment interconnected by means of transmission media to



form a communications network. Such a network is used to provide the transmission path for any combination of voice, image, text or data communications.

2.3 Temporary Communications Facilities

Within the definition of this Recommended Practice, Temporary Communications Facilities to serve a project is a set of telecommunications systems and networks which are deployed solely for the duration of that activity.

These temporary facilities will in most cases be removed completely at the end of the activity, but in some instances some or all may be retained and integrated into the permanent Telecommunication systems that are provided for the offshore installation.

3. PURPOSE

The need for a separate temporary telecommunication set-up in addition to the permanent telecommunications systems that will be installed for communication on and within the platform, should be decided early in the project design phase. This need should be stated clearly and justified to avoid any unnecessary expenditure and to ensure that adequate communication facilities are provided for the offshore construction and commissioning teams and for linking to the company's shore based project office. In addition the way in which the various types of communication needs are satisfied should be explored based on what permanent communication facilities will be available for the main offshore platform immediately after hook-up and what communication facilities are being supplied by any of the contracted services.

The reasons for needing a temporary telecommunication system during the offshore construction and commissioning phase of an offshore project are well known, and many years of experience in establishing these systems has allowed the particular needs to be refined and the best choice for source of supply to be selected. However, each project has its own particular view of how the project should be run, and how the temporary telecommunications is provided is no exception and must be fully justified along with all other project expenditure.

The main reasons for employing temporary telecommunication facilities are summarised as follows:-

- (a) Temporary telecommunication facilities are required to support the offshore hook-up, construction and commissioning phases of the offshore development, to provide:-
 - (i) Communication network links between the accommodation vessel ('Flotel'), the main platform, the



public telecommunications network and the onshore project office.

- (ii) Communication with support vessels and helicopters.
- (iii) For communications around the main platform/accommodation vessel complex.

The quantity and capacity of the telecommunication facilities that are needed will normally justify the need to use a totally independent set of temporary telecommunication systems.

- (b) The permanent communication system being provided for the offshore platform will not be fully commissioned and operational in time for use by the construction and commissioning teams.

Telecommunication facilities will be required by the construction and commissioning teams within twenty four hours of the accommodation vessel coming alongside the main platform. The permanent telecommunications systems on the main platform will be installed and commissioned in accordance with a phased programme that slots into the overall programme for the project and they would not be ready to meet the hook-up timescale.

- (c) The permanent communication system will not normally have sufficient channel capacity or bandwidth to simultaneously handle the telecommunication needs for operations and the construction and commissioning teams.

If this is not the case then the main permanent system may be over designed. Rarely does the permanent telecommunication system have enough spare capacity to meet the telecommunications channel requirements for the offshore construction phase. There are many more people and much more activity during the construction of an offshore platform than during operations , and this is reflected in the quantity and capacity of the telecommunications facilities that are needed.

- (d) The permanent telecommunication system facilities will not be available for use during the offshore construction phase, they will be allocated to various other platform facilities and will need to be available for commissioning other platform systems.

E.g. the communication channels needed for the commissioning of the instrument and control telemetry systems will be required to be independent of any other communication needs and must be available as and when required.

- (e) The other permanent platform facilities can be commissioned independently, and any constraints imposed on them by trying



to commission and use the permanent telecommunication system early are avoided if a separate temporary telecommunication facility is installed.

The permanent telecommunication system relies on many other platform facilities before it can be used fully e.g. electrical power, fire and gas, HVAC, and ESD systems etc. must be commissioned before the permanent telecommunication systems can be considered reliable. It is highly unlikely that the permanent telecommunication system could be used without these support facilities, and additional temporary provisions would need to be made.

- (f) The main electrical power supplies on the platform will not be available or reliable until the initial certificate of fitness is received. The permanent telecommunication systems installed on the platform cannot be relied upon until this is achieved.
- (g) The standard communication facilities that are permanently fitted to the accommodation vessel are usually inadequate, and are situated in the wrong location on the vessel. The accommodation vessel contractor is often reluctant to take responsibility for the complexity of the telecommunication needs during the construction of an offshore platform and will try to rely on the basic marine and aeronautical communication equipment that are standard fittings on any ocean going vessel.

The basic provisions installed on any ocean going vessel are designed to provide the telecommunication needs while the vessel is at sea and these are generally adequate to meet its needs while travelling from one location to another. However, these basic telecommunication provisions are totally inadequate to handle the communication requirements that are needed while constructing an offshore platform. The standard equipment is not sufficient for the size of operation or quantity of personnel that are offshore during this period. The accommodation vessel's telecommunication facilities are usually installed in or very close to the vessels radio room and bridge which are normally well away from the office locations used by the company's project personnel.

Note: In order to make use of the company's existing private telecommunications network and use the company's existing operational and emergency telecommunication facilities, the projects onshore and offshore temporary telecommunications systems should be interconnected to the company's private telecommunication infrastructure.



4. COMMUNICATION SYSTEMS REQUIREMENTS

4.1 General

From past experience it has been found imperative that telecommunication facilities and links be provided to the offshore accommodation vessel from the onshore private and public telecommunication networks, to provide radio, telephone and data communications for the offshore construction and commissioning phases of the offshore development project. The telecommunication facilities required can be divided into the following categories:-

- (i) Network communications and links for providing telephone, text, video and data services.
- (ii) In-field radio communications for communication with support vessels and helicopters.

E.g. typically communications to support vessels such as for diving support, pipe laying and standby vessels would be required.

- (iii) Local on-platform radio, telephone and data communications for communication within the main platform/accommodation vessel ('Flotel') complex.

Figure 1 shows a typical set-up of temporary telecommunication facilities that are normally provided to support the hook-up, construction and commissioning of an offshore platform.

4.2 Network Communication Facilities

This category would include all the private, national and international, telephone, text, video and data communications likely to be required from the offshore accommodation vessel. It would include:-

- (a) Telephone and facsimile access into the public switched telephone network (the PSTN)

Depending on the size of the operation, between three and six lines have normally been required, These are usually shared with the lines that are provided for connection to the company's private telephone network.

- (b) Telephone and facsimile connection into the company's private telephone network

Depending on the size of the operation, between six and twelve lines have normally been required, These are usually shared with the lines that are



provided for connection to the public switched telephone network (the PSTN)

(c) Telephone and facsimile connection to the main platform.

Initially before the permanent telecommunication systems on the main platform are established, one or two long-line extensions would be fitted on the main platform and connected to the accommodation vessel's temporary PABX. When the permanent PABX on the main platform is established about six tie-line trunks would be connected between the PABX on the accommodation vessel and the PABX on the main platform.

(d) Connection to the company's main computer networks for accessing data bases on materials, project records, personnel, etc. and electronic mail

Depending on the size of the operation, between six and twelve remote terminals have normally been required during offshore construction. Two alternative means of communications should be provided to maintain reliability of information relating to movements of personnel offshore. Statistical multiplexers fitted with traffic balancing fulfil this requirement if dual routes to shore are available. However, the provision of dual routes to shore is not normally economical and an Inmarsat terminal with voice and facsimile facilities should be adequate.

At the onshore office certain circuits may be extended by private wire to a number of other onshore office locations and to other locations, as appropriate.

Either statistical multiplexers and line drivers or hubs/file servers and 10 Base T/10 Base 2 cabling would probably be used although other types may be acceptable. The interfaces could be either CCITT V24/28, X21, X21 bis, V11, V35, EIA RS 232, RJ45, RJ11, AUI, 10 Base T, 10 Base 2 etc.

The system end to end transmission performance from terminal location to onshore network port should be so designed that any errors that occur on the links will be absorbed by the data system. The equipment should incorporate error control facilities to minimise the number of errors in the received data. The error control facilities should be optimised for use over satellite communication links and sufficient data buffering should be provided. All interconnecting cabling including patching facilities between the hubs/file servers, statistical multiplexors/modems as required from the data terminal equipment should be provided.

(e) Point-to-point facsimile connections to the company's shore based project office for day-to-day project and procurement activities.

One or two are normally allocated for day to day activities and helicopter logistics, and a third dedicated to material procurement staff.



- (f) Point-to-point 'hotline' type telephone connection to an emergency incident control room

Two alternative means of communications are required for the emergency communications hotline telephone. However, dual communication routes may not be available and an alternate emergency communications link such as an Inmarsat terminal would normally be provided for this purpose.

The projects 'hook-up emergency procedures' document usually refers to the use of a hotline telephone link for emergency communications to the mainland during an offshore incident.

- (g) Point-to-point 'hotline' type telephone connections to the company's shore based project office for senior management and material staff.

One is normally provided between the Resident Engineer's office offshore and the onshore Construction/Project Manager offices (i.e. parallel line) and a separate one provided between material procurement staff offshore and onshore.

- (h) Point-to-point video conference link to the company's shore based project office

Where there is sufficient justification for the additional equipment costs and extra communications link bandwidth required, a dedicated video conference link fitted with document cameras and video recorders could be useful for holding project meetings and for providing technical advice to solve technical problems. The use of a document camera and a video recorder together with the video image of the person talking enables people to discuss technical drawings or videos without the need to travel offshore. It has also enabled onshore staff to acquaint themselves with problem areas before visiting the offshore complex, giving them time to think about possible solutions. The link has normally been provided between a dedicated office on the accommodation vessel or the Resident Engineer's office offshore and a dedicated project office or the Construction/Project Manager offices onshore

4.3 Network Communication Links

- (a) A line of sight microwave radio link should be provided to carry the communication needs from the accommodation vessel to the adjacent main platform. As a minimum this should provide the equivalent of six analogue voice channels.

In order to avoid any problems with cable umbilicals between the main platform and the accommodation vessel e.g. breakage and routing, and in order to not interrupt communication with the main platform during bad weather when the accommodation vessel will be 'standing-off' from the main platform, a microwave radio link should be provided. However, this would only be operational when the main platform has permanent or



temporary facilities available i.e. electrical power etc., and the Flotel's movement is not excessive. It is unlikely that a microwave link could maintain continuous communications during very rough weather or while the accommodation vessel is being towed away from the main platform, and an alternative less directional form of radio link would be needed, e.g. single channel uhf link.

- (b) A main bearer telecommunication (radio) link should be provided to carry the communication needs from the accommodation vessel to the mainland. As a minimum this should provide the equivalent of twelve analogue voice channels. These would be shared between the facilities described above.

On a majority of past projects the main communication link to the mainland from the accommodation vessel 'Flotel' has been arranged by relaying via an existing adjacent offshore platform structure. This has been independent from any of the permanent communications links being provided for the main platform. However, this is not always possible; e.g. adjacent platform operators are not necessarily willing or able to provide spare capacity ; the adjacent platforms' are not close enough for a line of sight radio link or the cost of this option is excessive compared to providing a completely separate system.

Secondly, it may be possible to use part of the permanent communications system by duplicating the 'back-up' route i.e. the permanent communications links to shore are usually provided with two routes to the mainland which traverse different geographical directions , and one of these routes could be used temporarily by installing a duplicate radio terminal on the Flotel. This would remain in operation until it is time to commission the permanent communications. However, this option is not ideal since it will interfere with the progress of the permanent communication link commissioning and could hold up the completion and handover of the overall platform. It may therefore be far better to initially install a system which is independent of the main permanent links.

Thirdly, consideration can be given to using the permanent communication links once they are commissioned and operational, and it may be possible to 'cut-over' the temporary telecommunication facilities to the permanent links later in the project development.

The movement of the Flotel and the limitation on the size of antenna dish for installation on the accommodation vessel would probably restrict the range of options available for the choice of the temporary telecommunication link to either a microwave line of sight (LOS) link or a low capacity radio satellite system (E.g. Inmarsat A or an Eutelsat Standard 3) Other options could be used (E.g. tropospheric scatter) if they were installed on a permanent structure and a microwave link was used to interconnect to the Flotel. In selecting the antenna systems for the LOS or the radio satellite system careful consideration must be made to movement of the Flotel and the accommodation space limitations imposed.



The type of link required should be selected based on the minimum availability and the bandwidth requirements.

The bandwidth channel capacity can be decided based on the following:

Typical requirements for a temporary offshore site would be as follows:-

	Type of Traffic	Function	No of Circuits	Total Analogue Bandwidth or Digital Capacity*	Availability (%) see comment below
1	Speech	PSTN access	3	12 kHz 24 kB/s	99.90
2	Speech	PABX tie lines private use	6	24 kHz 48 kB/s	99.90
3	Speech	Hotlines	3	12 kHz 24 kB/s	99.90
(No. 2 above could be shared with Service (1) Digital capacity is based on 8 Kb/s per speech channel) *Digital capacity is normally available in quantities of 64 Kb/s and is shared between the various service requirements					
4	Facsimile	PSTN access or incl. PABX private use	2	8 kHz 9.6 kB/s	99.90
5	Data	10 Computer Terminals via modem	1	4 kHz 9.6 kB/s	99.90
6	Video	Video conference (optional)	1	64 kB/s	99.90
7	Spare	Maintenance	1	12.8 kB/s	99.90

Total Capacity Requirement is 192 kB/s with an availability of 99.9%

Availability:-

(Typically, analogue or digital channels can be considered unavailable when the signal to noise ratio in each 4 kHz (3.4 kHz) channel falls below 30 dBp or when the bit error rate (BER) is worse than one in ten thousand. However, this aspect needs to be considered carefully with other aspects of the interface e.g. with multiplexer performance. The interface requirements for each channel should be specified e.g. CCITT V11/X21 or V24/V28 etc.

From the options described, the most suitable choice would probably be a fixed service digital radio satellite system operating at 192 kB/s. This would need an antenna dish size of about two metres diameter and a low power transmitter of around 5 watts. Digital multiplexing and voice compression techniques would be used to allocate the channel requirements within the available bandwidth. The system should be procured (or hired) to meet the radio satellite regulatory authority's performance requirements, e.g. Eutelsat/Intelsat.

Back-up communications would normally be provided by an Inmarsat terminal equipped with dual ID's for voice and facsimile. However, the



procurement or hire of a temporary multichannel microwave link may also be considered. For certain facilities a back-up alternate microwave communication link would be desirable. In this case the possibility of installing a single or two channel LOS microwave link should be considered. (e.g. 1.5 GHz). Alternatively, a cellular type cordless telephone may be adequate. However, the range of these is limited and it will be necessary to use a high power version with an externally mounted antenna (e.g. yagi) to achieve acceptable performance. This arrangement was successfully used for the fields in the southern north sea where ranges of up to 65 km from shore were achieved.

- (c) The system should be highly reliable and preferably configured such that any single failure of equipment item supplied as part of the system shall not result in the complete loss of services critical to the operation, or it should not significantly affect more than half the capacity of the services.
- (d) All equipment shall be approved for connection to any public or private circuits provided by the public telecommunications provider.

4.4

In-Field Communications

This category would include all the communication systems likely to be required from the offshore accommodation vessel to standby emergency support vessels, supply boats, UK mainland radio coast stations, coast guards, diving support vessels and helicopters. It would include:-

- (a) Mf/hf ssb international marine band radio telephone for communications with long range shipping (i.e. greater than about 30 miles)

This facility would be provided on the accommodation vessel as a mandatory SOLAS requirement and would include back-up equipment. It would be permanently installed. A second unit is unlikely to be needed.

- (b) Vhf international marine band radio telephones for communications with short range shipping (less than about 30 miles)

This facility would be provided as a mandatory SOLAS requirement and would be permanently installed on the accommodation vessel. A second unit is unlikely to be needed.

- (c) Vhf international aeronautical band radio telephones for communications with helicopters



This facility would normally be permanently installed on the accommodation vessel. A second unit is unlikely to be needed.

- (d) Marine radar for monitoring of shipping movements within the vicinity of the accommodation vessel.

This facility would normally be permanently installed on the accommodation vessel. A second unit is not needed.

- (e) Weather monitoring equipment, used to advise helicopter pilots of weather conditions around the accommodation vessel.

This facility would normally be permanently installed on the accommodation vessel. A separate unit is unlikely to be needed.

- (f) Radio navigational direction beacon, for helicopters to locate the accommodation vessel in bad weather

This facility would normally be permanently installed on the accommodation vessel. A second unit is not needed.

- (g) Vhf international marine band radio telephones and emergency indicator radio beacons for lifeboats - used in an emergency for voice communications to rescue vessels and as radio locator beacons to aircraft

These facilities would normally be permanently installed on the accommodation vessel, but should be verified and checked.

- (h) Uhf single or two channel radiotelephone link for voice communications to support vessels; used for diving support and emergencies and connected as long-line telephone PABX extensions.

The equipment would normally be allocated to more than one user. Initially it would probably be used for voice communications to the diving support vessel during anchoring operations and then possibly used by other vessels supporting pipe laying activities. The standby support vessel could also use the link for emergency back-up communications. The equipment is required to be mobile, adaptable and designed for easy installation.

- (i) Inmarsat terminal equipped for dual ID's and fitted with voice and facsimile facilities.

An Inmarsat terminal is likely to be available on the accommodation vessel but it is not mandatory. If it is fitted it is usually located away from the project offices and not available for access to project staff on the accommodation vessel. This unit can be vital for emergencies and for the continued operational progress of the project and will almost certainly be



required during periods of rough weather when the other forms of communication may be out of operation. A second unit should be provided and located in a convenient position within easy access for project staff.

The equipment is normally hired for the duration of the offshore phases of the project and is specified in accordance with Inmarsat requirements.

4.5 On-Platform Communications

This category includes all the communications systems needed for local communications around the accommodation vessel and the main platform complex for regular and emergency communications. Facilities required include:-

- (a) Telephone exchange PABX with telephones located in project offices on the accommodation vessel

The PABX on the accommodation vessel should provide telephone extensions to about 50 locations. The PABX will need to be provided with signalling interfaces for interconnection to the PSTN (Public Switched Telephone Network), the company's private telephone network i.e. tie-line trunks, and for long-line extensions (connected to uhf radio links to support vessels and to the microwave link routed to the main platform). The quantity of junction circuits would be about twelve. A quantity of three or four card-phones will also be required to be installed in booths on the accommodation vessel for staff to use for personal calls to shore. The cardphones would normally be connected to the PABX and will be allocated a suitable class of service. Any specification for the equipment should include a full range of features and class of service flexibility, including the ability to operate within BPX's existing network and linked numbering scheme. Full details of the networking features required should be included in the system definition. An operators position may be required on the accommodation vessel for answering incoming calls or this may be dealt with by the BPX network operator onshore.

- (b) Uhf handportable radios used for general platform wide communications, for construction, commissioning and administration

It will be necessary to provide a number of uhf radio repeaters so that coverage across the platform/accommodation vessel complex can be achieved. One repeater will be needed for each channel. Normally three repeated (duplex/two frequency simplex) channels will be needed and three, single frequency simplex channels. Up to 100 six channel radios have been used on past projects, which have been divided amongst the various disciplines.

In order to avoid misuse and confusion with operation (i.e. channel allocation) the distribution of handportable radios must be tightly controlled by senior project staff, and administered by nominated personnel. On past projects, inadequate coordination of handportable radios has caused incorrect allocation and distribution, which has led to



delays in commissioning. Most activities on the project are dependent on person-to-person radio contact to achieve completion and it is vital that the correct people are issued with reliable uhf handportable radios

The radio system shall provide facilities for voice communication between handportable radios and for the possible interconnection to telephones via the PABX using a switching unit and a phone patch.

The handportable radio sets shall be of rugged light weight construction equipped with an integral microphone, a loudspeaker, a battery and a carrying case that is fitted for attachment to an industrial belt. They shall be supplied with and have adequate connections for a remote lapel type loudspeaker/microphone or a headset with integral noise-cancelling boom microphone. Headsets shall be suitable for wearing with a hard hat and have facilities for hands free operation. All control knobs and switches should be suitable for operation by personnel wearing industrial gloves. All handportable radios shall be suitable for heavy use and occasional drops from a height of 1.5 metres on to hard ground or metal. They shall be weatherproof (IP 54) and resistive to sea water sprays, oil, mud and chemicals. Battery capacity shall be sufficient for at least 8 hours normal use (90% standby - 10% transmit).

The radio sets together with any accessories such as remote speaker/microphone and headsets/boom microphone should be certified intrinsically safe for use in Zone 1 hazardous areas. IS handportable radios may not be needed during the early stages of the project i.e. until hydrocarbons are present, however, the administration requirements of separating IS and non-IS radios may not be practical and it may be more beneficial to have only one type of radio that can be used for any situation.

Uhf radios shall operate in the 450-470 MHz band and comply with [MPT 1303](#).

Each uhf handportable radio shall automatically switch a uhf repeater into the talk through mode facility by the use of CTCSS signalling. This shall be in accordance to DTI [MPT 1306](#) requirements.

Battery chargers shall automatically discharge batteries before recharging. Battery capacity indications shall be included.

- (c) Vhf marine handportable radios for communications with construction vessels located adjacent to the accommodation vessel and for crane loading activities

The use of vhf marine handportable portables is not so critical to the operation as uhf handportable radios and between ten and twenty-five have been required on previous projects, each equipped with six of the 'intership' channels including channel 16, the international marine calling and distress frequency. Vhf marine radios shall operate in the international marine frequency band (156 to 162 MHz) and comply with [MPT 1251 and 1326](#).



- (d) Vhf aeronautical handportable radios for communication with helicopters.

Two or three have been needed on past projects. IS vhf aeronautical handportable radios are not readily available and adequate operating procedures will be required if they are likely to be used when hydrocarbons are present around the platform complex. Vhf aeronautical radios shall operate in the aeronautical frequency band (118 to 137 MHz) and comply with CAA specification OP 15. Vhf aeronautical radios would usually only need two or three channels including the international aeronautical emergency frequency

- (e) Entertainment system for the reception and distribution of satellite TV broadcast programmes to recreation areas.

In the past, this facility has been provided for the general use of offshore staff, and may already be fitted on the accommodation vessel or supplied as part of the requested recreational facilities. The technical details for the provision of this facility are normally incomplete and although the basic system is functional for a single TV/channel, the requirement to provide for the distribution of programmes to other areas or for the reception of two or more channels simultaneously are rarely considered or known.

- (f) Local area networks for interconnection of personal computers.

Systems such as Local Talk/Appletalk, Ethernet, 10 base T/10 base 2 and optical fibre can be used, but clear definition of what applications/type of PC's are being used must be decided before the type of LAN can be specified.

- (g) Personnel movements system for reading and recording data on the whereabouts of personnel travelling from the mainland to offshore, and between the accommodation vessel and the main platform

An electronic card reader/ badge reader system would normally be installed in the accommodation vessel's helicopter landing office. This would read the stored personal data from a badge or card for each individual travelling to and from the accommodation vessel. The data would be relayed to the mainland over the network communication link and held on the company's 'personnel movements system (PMS)' data base for access by logistics staff. Monitoring of personnel movements between the accommodation vessel and the main platform may use a 'T' card system and an electronic card reader/badge reader system may not be required. If this system is used then it may be desirable to have duplicated equipment to meet the availability requirements. As a back-up, information could be sent by facsimile over the Inmarsat system.



Certain other types of temporary facilities will normally be required to support the temporary telecommunication systems. These can be summarised as follows:-

- (a) Temporary communications cabin required to house and provide containerised transportation for the temporary telecommunications equipment.

The cabin would be used for road and sea transportation, and to accommodate the temporary telecommunication equipment on the accommodation vessel offshore. It should be fitted out with all the necessary facilities including lighting, trunking, power sockets, electrical earthing, fire extinguishers, and with the telecommunication equipment installed and operational. The cabin should be A60 (H) fire rated, airtight, heated, ventilated and air-conditioned so that it can remain operational when there are external hydrocarbons present. The cabin should have an adequate air-lock door opening entrance and come complete with electrical emergency shutdown, pressurisation, and fire and gas detection/alarms. Cable transits should be provided for the running of external cables. Provision should be made for the connection of external/internal cables to suitable and adequate termination boxes, patch-panels and test-jack frames. Pre-wired Ex(d) termination panels should be fitted and mechanically protected on the outside wall of the cabin so that external electrical power/telephone and data cabling facilities can be connected quickly. External earthing bosses will be needed for direct connection to the accommodation vessel deck. The cabin should be separated into compartments/rooms so that the different types of telecommunications equipment can be separated from the wiring panels, electrical power supplies and switchgear, and from the spares/documentation/test equipment and antenna/cable storage facilities. Adequate facilities should exist for mounting antennas on the roof and on the outside of the cabin. The cabin would tend to be a standard design steel shipment container but reinforced, environmentally protected, strengthened, and fitted with cladding, doors, windows, wall panelling, false ceiling, storage and cupboard space, shelves, work surfaces and an emergency kick-out panel. The cabin should be suitable for lifting and clamping/bolting down in position on the accommodation vessel. Lifting aids/eyes/spreader bars should be fitted and located so they do not foul any roof mounted equipment.

- (b) Electrical power supplies and electrical distribution for the temporary telecommunications equipment.

The electrical power would be taken from the accommodation vessel's main supply and fed into the telecommunications cabin for regulation and filtering before distribution to the telecommunications equipment. Provision should be made for installing adequate ac and dc battery power supplies to provide the necessary voltage requirements and ups back-up needs. Two to three hours battery capacity is normally sufficient.

Special Requirements

The facilities described above are typical of the requirements used for previous offshore installations. However, other types of communication facilities may be needed and these are described as follows:-

(a) Drilling Communications

In parallel with the temporary telecommunication facilities needed for offshore construction and commissioning, communication facilities may also be required for associated drilling operations. Facilities would be required for voice and data communications from the offshore drilling vessel to the onshore drilling office, and it may be possible for these to be routed and combined with the communication facilities being provided for the accommodation vessel.

Voice and data/teletype links are usually required by the offshore BPX drilling team to provide communications for daily drilling reports and for day to day voice contact with the onshore drilling manager and technical support personnel. These requirements are normally satisfied by a completely separate telecommunication system such as a radio satellite or an hf ssb link. However, communication links could be shared and the allocation of channels for drilling at an early stage in the definition of the temporary communication link requirements for construction and commissioning could reduce the overall telecommunications expenditure. A one or two channel uhf or microwave radio link from the drilling vessel to the accommodation vessel would normally be required.

(b) Onshore Communications

Normally it is impossible to ignore the communication requirements of the onshore construction/ commissioning teams who are resident in the mainland project offices when deciding the offshore communications needs, and it will be necessary to integrate any communication set-up offshore with the requirements onshore. This is particularly important for the network communication systems where the provision of temporary telephone PABXs and data communication networks onshore must be compatible with the provisions offshore in order to ensure that the overall network will operate satisfactorily.

It is preferable that any specifications for temporary telecommunications systems required onshore are developed and issued at the same time as those required offshore, and that the interface requirements are clearly identified. The requirements of the various regulatory authorities can be different for equipment maintenance and operation on the mainland and it



will be necessary to identify any differences in telecommunication maintenance responsibilities for the various systems so these are clear to operational staff responsible for organising these matters.

(c) Interfaces to the Main Platform

In addition to the interface areas identified above there are other requirements for interconnection with systems on the main platform. These are summarised as follows:-

- (i) Main platform PABX telephone extensions on the accommodation vessel.

This is normally required in the latter stage of the project when some of the project staff have moved on to the main platform and they are split between the two locations. During this time part of the accommodation vessel's communication systems may be recovered and returned to the hirer.

- (ii) Interfaces between the public address and alarm systems on the accommodation module and the main platform.

There will be a need to interconnect the public address/alarm warning evacuation systems so that verbal and alarm warnings initiated from either the accommodation vessel or the main platform can be heard over the entire complex. This will normally only be required while the accommodation vessel is connected to the main platform by the walk bridge, and therefore the bridge cable umbilical can be used.

4.8 Emergency Communications

Procedures for dealing with an incident or an evacuation will be developed for each offshore installation according to the general guidelines used by existing offshore platforms. However, during the early stages of hook-up only temporary facilities exist and special procedures will be required which may include the facilities provided by the temporary telecommunications systems.

The way in which the vessel's fixed communication systems and the temporary telecommunication systems can be used for emergency situations are described as follows:-

Communications to the mainland is initially provided by the use of the vessel's ship-to-shore mf/hf ssb radio and Inmarsat system. Later when the other telecommunications equipment are established on the accommodation vessel the emergency hotline telephone link can be used for direct contact with the company's emergency incident control centre. In addition, the temporary telephone system PABX can be used to access any other onshore emergency services that may be required. However, this would depend on the coordination procedures that are developed for the installation.



Communications to other vessels and helicopters would be provided by the vessel's own mf/hf and vhf marine and vhf aeronautical fixed radiotelephone systems. Communication to other adjacent offshore platforms may also be established by either mf/hf or vhf marine radio depending on the range.

Communications around the accommodation vessel/platform complex would rely on the vessel's own intercommunication, public address and alarm systems for warning personnel of any incidents and evacuation requirements. The temporary telecommunication systems being provided for 'on-platform' communications are unlikely to be used during an incident. Any requirement for handportable radio communication would

be restricted to personnel controlling the situation and only vhf marine handportable radios are likely to be used.

5. IMPLEMENTATION

5.1 General Planning

Careful attention to planning is vital in the provision of temporary systems because such systems are an essential early component of projects. A positive method of identifying key dates and ensuring that the design, procurement (or rental) and installation activities are scheduled to meet objectives is required. Long lead delivery items need to be identified at the outset as do any consents, licences or frequency allocation requirements.

Major projects have depended heavily on effective communications for their success and the objective should be to provide a cost effective solution that meets the project timescales.

5.1.1 Planning Concepts

In order to satisfy these requirements the following planning concepts should be adopted:-

- (a) A fast-track programme.

For ensuring that each task on the programme is closely monitored and all timescales are met.

- (b) A single point of contact to be appointed and be in direct control for managing the implementation.

There are many contractors, suppliers and vendors to be coordinated, including hired and purchased equipment. There is also a need to liaise with existing company network suppliers/maintainers and the main platform contractors. Only by the use of a company or company nominated technical representative managing the implementation by



proven external vendors, can success be assured. A full time supervisor of the activities involved is necessary to coordinate the various tasks and to have the necessary authority for rapid coordination and for the vital negotiations that are needed with the telecommunication regulatory administrations.

(c) Minimum levels of documentation.

Only the absolute minimum of design and procurement documentation should be contemplated. Implementation should rely more heavily on close cooperation with the selected vendor(s) for meeting the technical performance and timescales required.

(d) Minimum of formal design.

Only simple and straightforward designs should be employed. Complex system interfaces should be avoided wherever possible.

(e) The use of an appropriate suppliers.

As a basic principle, the use of unproven suppliers should be avoided if at all possible. Suppliers should only be used where they have a proven track record for such projects and where they have internal organisation geared to rapid response situations. Large institutional type organisations are generally not well suited to this role.

(f) The use of standard and well proven equipment.

Equipment should only be considered where it has been proven in a similar application. Rugged construction, reliability, maintainability and climatic durability are factors which should receive particular attention. Equipment should be selected which demonstrates some flexibility in its modes of operation, as redeployment may be necessary at some stage in the project.

5.1.2 Early Planning and Design

The following activities should be considered during the early planning and design:-

(a) Mandatory or Regulatory Requirements

Radio frequency licence requirements and telecommunication administration equipment and operating approval needs should be discussed with the regulatory authority very early in the planning stage. Any constraints should be incorporated in the telecommunications system planning.

(b) Radio Propagation Considerations



It will probably be necessary to interconnect to existing offshore platforms or to onshore locations and radio satellites using radio links, and although this may only be for a limited period, detailed radio propagation calculations need to be completed in order to confirm that the performance requirements can be achieved. Any changes to system design can then be incorporated at an early stage without incurring large costs. The relative positions of the various support vessels and main platform with respect to the accommodation vessel should also be investigated at an early stage to ensure that there will be a clear line of site for any antenna beams and the various structures located offshore will not block radio propagation.

(c) Suppliers and Vendors.

It will be necessary at an early stage to determine which vendors are capable and willing to carry out the work. It will probably be necessary to sub-divide the activities amongst various suppliers and contractors according to their abilities and availability. It will probably also be necessary to use vendors and contractors who are involved in the permanent telecommunication systems for the offshore project. This breakdown of task responsibility should be decided at an early stage in order to ensure all tasks are allocated and accounted for.

5.2 Procurement Philosophy

The various types of telecommunications equipment needed for the offshore hook-up and construction/commissioning can be obtained from a number of sources and suppliers. Generally it is preferable to obtain all the needs from one supplier/vendor, who would be responsible for the complete package including the provision of a totally fitted out telecommunications cabin and the provision of full time radio operator technicians. It is also generally preferable if the telecommunications cabin can be hired for the duration of the project's needs and returned to the supplier at the end of the contract. However, this is not always possible and other options must be considered as follows:-

- (a) Hired from telecommunications 'system-house' for the duration of the project.
- (b) Hired from PTO (BT or MCL in the UK).
- (c) In house company own existing network supplier/maintainer.
- (d) Standard fitment on accommodation/other vessels.
- (e) Purchased.
- (f) Main platform contractor(s).



A summary of the requirements and possible sources of supply are tabulated as follows:-

Temporary Telecommunication Facilities - Possible Sources of Supply	
System/Equipment Type	Source/Supplier
Network Facilities	
1) Radio satellite fixed digital radio link	Hired from telecommunications 'system-house' for the duration of the project.
2) Radio satellite circuit(s)	Hired from PTO (BT or MCL in the UK)
3) Microwave radio link(s)	Hired from telecommunications 'system-house' for the duration of the project
4) Company data requirements, terminals, PC's, and communication network devices	In house company own existing data network supplier/maintainer
5) Facsimile machines	In house company own existing supplier/maintainer
6) Hotline telephone system(s)	Hired from telecommunications 'system-house' or from in house supplier/maintainer
7) Video conference equipment	In house company own existing supplier/maintainer or purchased. It is unlikely that this equipment could be hired.



Temporary Telecommunication Facilities - Possible Sources of Supply	
System/Equipment Type	Source/Supplier
In-Field Communications	
1) Mf/hf ssb marine radio	Standard fitment on accommodation vessel
2) Vhf marine radio	Standard fitment on accommodation vessel
3) Vhf aeronautical radio	Standard fitment on accommodation vessel
4) Marine radar	Standard fitment on accommodation vessel
5) Weather monitoring	Standard fitment on accommodation vessel
6) Aeronautical non-directional radio beacon	Standard fitment on accommodation vessel
7) Lifeboat communications	Standard fitment on accommodation vessel
8) Inmarsat	Possible fitment on accommodation vessel but second unit should be hired from telecommunications 'systems house' for the duration of the project
9) Uhf radio link(s)	Hired from telecommunications 'system-house' or from in house supplier/maintainer
On Platform communications	
1) Telephone PABX/system	In house company own existing telephone network supplier/maintainer, or hired from telecommunication 'system house' for the duration of the project.
2) Uhf handportable repeaters	Hired from telecommunications 'system-house' or from in house supplier/maintainer
3) Uhf/vhf handportable radios	Hired from telecommunications 'system-house' or from in house supplier/maintainer
4) Satellite TV receive system and distribution	Hired through accommodation module contractor or directly from telecommunications 'systems-house'
5) Local area network	In house company own existing data network supplier/maintainer
6) Personnel Movements System	In house company own existing data network supplier/maintainer
Common Systems	
1) Telecommunications cabin	Hired from telecommunications 'system-house'
2) Electrical power supplies/distribution	Hired from telecommunications 'system-house'
Special Requirements	
1) Drilling communications	Hired from telecommunications 'system-house'
2) Onshore communications	In house company own existing network supplier/maintainer
3) Platform interfaces	Main platform contractor(s)
Radio operator-technicians	Hired from telecommunications 'system-house'

5.3 Implementation Programme

The list of activities that are necessary to implement the temporary telecommunication requirements can be divided in to three phases as follows:-

(a) Design Phase

This stage would involve the justification and definition of the communication needs followed by the specification and detailed design of the temporary communications requirements. This would include the details for integration in to the existing



networks and for arranging the regulatory issues that are required. It would also include how the allocation of the various duties and equipment supply will be arranged and a procurement plan should be produced.

Normally the definition of the temporary telecommunication requirements would be decided at the same time as when the permanent telecommunications being provided for the main platform are being designed. The justification for using a temporary communication set-up would need to consider what permanent communications may be available and what the tie-in arrangements could be. Radio frequency licences and regulatory issues should be discussed with the authorities when the permanent communications are being discussed so neither set-up is compromised by local constraints in this area. Likely system solutions and sources of supply should be surveyed and investigated so a practical procurement plan can be decided.

(b) Procurement Phase

Purchase orders and arrangements for the various installation activities should be made and a detailed execution plan should then be produced based on the various contractors responsibilities. The progress of the individual orders should be monitored at key stages of each of the contractors plans. The accommodation vessel should be surveyed and installation plans made.

The procurement plan should identify when orders need to be placed to meet the project timescales for offshore hook-up. The temporary telecommunications must be ready as soon as the accommodation vessel is alongside the main platform which means installation must be completed and fully tested before the vessel is on location. The procurement phase can be critical when time is tight and close monitoring of the progress of all activities is vital so that corrective alternative actions can be quickly implemented if required. The accommodation vessel cannot be surveyed until the contract is placed and it needs to be in a convenient location (i.e dock or quayside). The survey is usually done without much time to spare and provisional arrangements for materials and possible locations for the cabin and the various antennas should be made beforehand. Cabin and antenna locations should be based on the most likely vessels, and decisions in this area should be made in advance. The survey should only be used to confirm the plans that have already been made

(c) Installation Phase

During this period the telecommunication cabin should be fitted out with the various equipment, tested and then installed on the accommodation vessel. The accommodation vessel cabling and associated fittings should be installed and the whole system commissioned with the mainland networks.



The telecommunications cabin is most likely to be hired from a telecommunication supplier who has used the cabin for other projects and oil companies. It will need to be refurbished, cleaned and fitted out to meet the new requirements. The progress of these activities can be delayed for many reasons and it is essential that this activity is monitored closely so resources are focused in to the right areas and concessions made quickly and where needed most. The coordination of the installation of the various items of equipment from the different contractors and suppliers is a full time task and delays in any area can delay the whole programme and also increase costs. It is important that the various contractors and suppliers work well together and are coordinated efficiently so that any compromises or alternative actions can be made as and when required.

6. OPERATION AND MAINTENANCE

During operation, the various temporary telecommunication systems that are on the accommodation vessel will need to be maintained. The interfaces to the onshore telecommunication systems will require to be coordinated and the various specialist telecommunication contractors will require supervision. This activity should be carried out by a full time appointed member of staff on the accommodation vessel.

This function should be handled by the full time dedicated radio operator/technicians on the accommodation vessel together with support from the onshore company network providers and with overall supervision being handled by the main platform lead telecommunications construction/commissioning engineer. The radio operator provided by the accommodation vessel contractor for the operation of the accommodation vessel's own radio equipment is unlikely to have adequate time to dedicate to the task.

A set of maintenance call-out and fault reporting procedures will need to be developed that also identify central locations for assistance with communication failures and breakdowns.

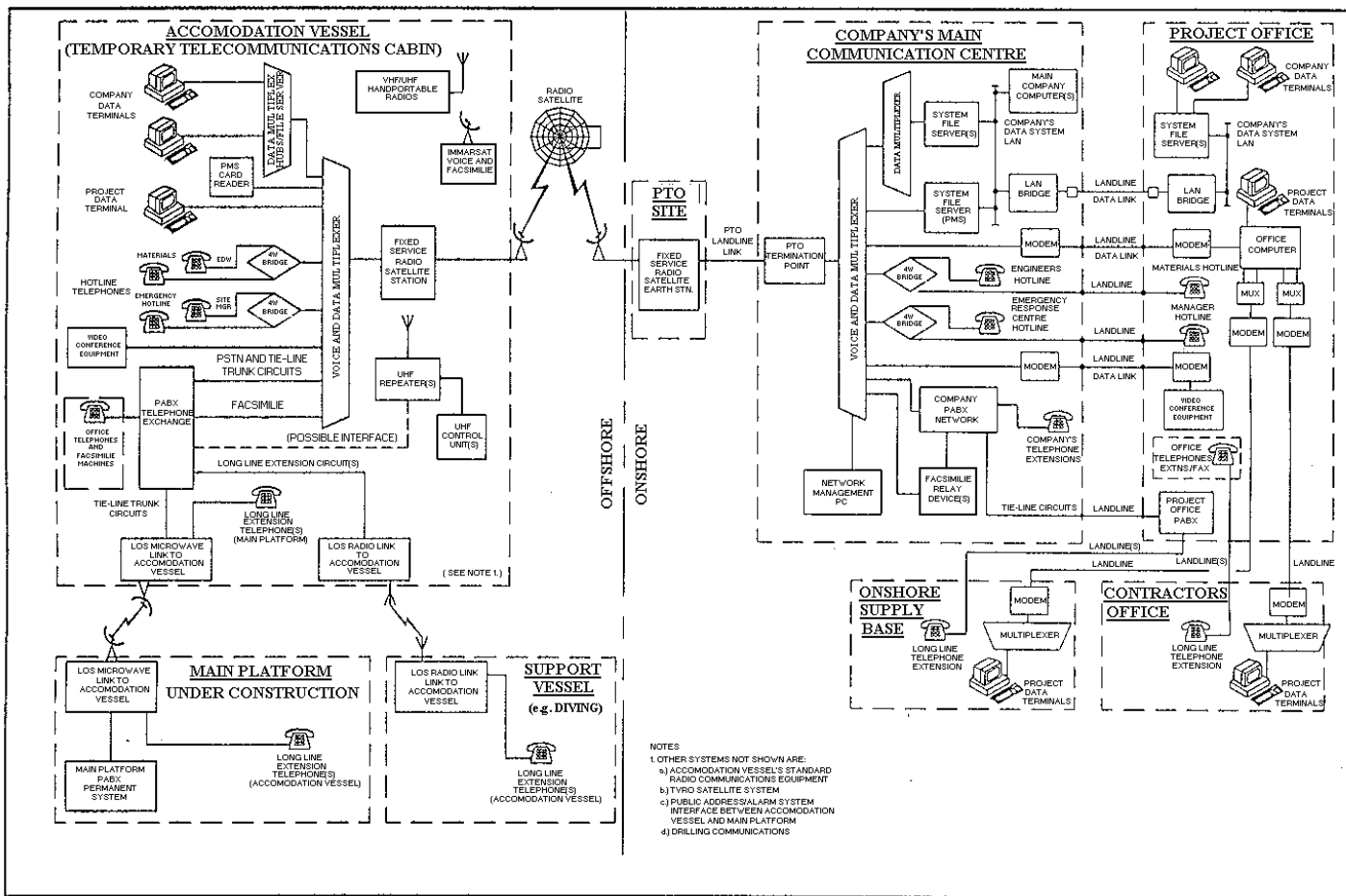
The centre for fault reporting tends to be the company's onshore help desk, however, in the first instance, all faults or complaints regarding service from the accommodation vessel should be handled by the offshore radio operator/technician. The lead telecommunications construction/commissioning engineer would supervise these two functions and act as coordinator and arbitrator for any dispute on relative responsibilities. Maintenance call-out requirements should be included in any contract details that are drawn up for equipment hire or equipment purchase after sales service .





TYPICAL TEMPORARY TELECOMMUNICATIONS SYSTEM BLOCK DIAGRAM

FIGURE 1



DEFINITIONS AND ABBREVIATIONS

Definitions

Standardised definitions may be found in the BP Group RPSEs Introductory Volume.

Abbreviations

AC	Alternating Current
AUI	Attachment Unit Interface (Data Communications connector interface between the Ethernet/IEEE 802.3 controller and the baseband transceiver or modem))
A60(H)	Fire Rated Wall designed to survive for 60 minutes in accordance with Department of Energy guidance for the design and construction on offshore installations
BER	Bit Error Rate
CAA	Civil Aviation Authority
CCITT	International Committee for Telephony and Telegraphy Recommendations
CTCSS	Continuous Tone Controlled Signalling System (For use in mobile radio services)
dB(p)	Decibel (psophometrically weighted)
DC	Direct Current
DTI	Department of Trade and Industry
EED	Electro-Explosive Device
EIA	Electronic Industries Association (USA)
ESD	Emergency Shutdown
Ex(d)	Flameproof enclosure in accordance with BS 5501 part 5 and BS 5345
FAX	Facsimile
GHZ	1 GHz = 1000 MHz
HF	High Frequency (3 MHz to 30 MHz)
ID	Identification Dialling Code
IEE	Institution of Electrical Engineers
IEEE	Institution of Electrical and Electronic Engineers (USA)
Inmarsat	International Maritime Satellite Organisation
IS	Intrinsically Safe in accordance with BS 5501 part 7 and BS 5345
ISO	International Standards Organisation
kB/s	Kilo Bits per second 1 kB/s=1000 Bits per second (Data Transmission Rate)
kHz	1 kHz = 1000 Hz
LAN	Local Area Network
MCL	Mercury Communications Limited



MF	Medium Frequency (300 kHz to 3 MHz)
MHz	1 MHz = 1000 kHz
MTTR	Mean Time To Repair
NDB	Non Directional Beacon
PABX	Private Automatic Branch Exchange
PTO	Public Telecommunications Organisation
SI	Statutory Instrument
SOLAS	Safety of Life At Sea (International Marine Organisation Regulations for sea going vessels)
SSB	Single Sideband
Uhf	Ultra High Frequency (300 MHz to 3000 MHz)
UPS	Uninterruptible Power Supply
Vhf	Very High Frequency (30 MHz to 300 MHz)



LIST OF REFERENCED DOCUMENTS

A reference invokes the latest published issue or amendment unless stated otherwise.

Referenced standards may be replaced by equivalent standards that are internationally or otherwise recognised provided that it can be shown to the satisfaction of the purchaser's professional engineer that they meet or exceed the requirements of the referenced standards.

The following are U.K. Regulations, Standards, Guides and Codes of Practice containing sections relevant to the design of Telecommunications Systems and should be referred to for the interpretation and application of this Recommended Practice.

British Standards

BS 5345: Code of Practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacture) Part 1 Basic requirements for all parts of the code Part 2 Classification of hazardous areas.

This is primarily concerned with the classification of hazardous areas and the selection of appropriately certified equipment for those areas;

BS 5501: Electrical apparatus for potentially explosive atmospheres Part 1 General requirements Part 5 Flameproof enclosures Part 7 Intrinsic Safety 'i'

This describes the requirements for equipment for use in hazardous areas;

BS 6656: Guide to Prevention of inadvertent ignition of flammable atmospheres by radio frequency radiation Revised 1991;

The Health and Safety at Work, etc. Act 1974

Current UK legislation requires that employers safeguard their employees and others who may be placed at risk by their activities;

Factories Act 1961

Regulation 9 of the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972



Mineral Workings (Offshore Installations) Act 1971

Offshore Installations (Construction and Survey) Regulations 1974, SI 1974/289 Prescribes the use of standards for the design and construction of offshore installations and includes requirements relating to equipment to be placed in hazardous areas.

Offshore Installations: Guidance on Design and Construction - Department of Energy Includes guidance on matters relating to certification, emergency shutdown systems and emergency power supplies.

Offshore Installations (Life-Saving Appliances) Regulations 1977, SI 1977/486 Includes specific requirements for General Alarm and Public Address systems.

Offshore Installations: Guidance on Life-Saving Appliances - Department of Energy Expands on the requirement for General Alarm and Public Address systems in SI 486.

Offshore Installations (Fire-Fighting Equipment) Regulations 1978, SI 1978/611

Offshore Installations (Operational Safety, Health and Welfare) Regulations 1976, SI 1976/1019 Includes requirements for basic communications facilities and radio operators.

Offshore Installations (Emergency Procedures) Regulations 1976, SI 1976/1542 Includes requirements for communications between the installation and the Safety/Standby vessel .

Institution of Electrical Engineers

IEE Recommendations for the Electrical and Electronic Equipment of Mobile and Fixed Offshore Installations

A general design guide for electrical and electronic equipment in offshore applications.

BP Group Documents

BP Group [RP 30-1](#) Instrumentation and Control - Design and Practice (Figure 5-5)
(replaces BP CP 18 Pt. 1)



BP Group [GS 112-12](#) Fire Resistant and Flame Retardant Cables
(replaces BP Stds 235, 236 and 242)

CCITT Recommendations

V11	Electrical characteristics for balanced double current interchange circuits
V24	List of definitions for interchange circuits between data terminal equipment and data circuit terminating equipment.
V28	Electrical characteristics for unbalanced double current interchange circuits
V35	Data transmission at 48 kB/s using 60-108 kHz group band circuits
X21	General purpose interface between data terminal equipment and data circuit terminating equipment for synchronous operation on public data networks
X21 bis	Use on public data networks of data terminal equipment which are designed for interfacing to synchronous V series modems

Department of Trade and Industry Radio Regulatory Specifications

MPT 1251	Phase modulated and frequency modulated vhf radio equipment for use in merchant ships
MPT 1303	Performance specification for angle modulated vhf and uhf radio equipment incorporating integral antenna for use in the private mobile radio service.
MPT 1306	Code of practice for CTCSS used in mobile radio systems
MPT 1326	Performance specification for angle modulated vhf and uhf radio equipment for use at fixed and mobile stations in the private mobile radio service

Electrical Industries Association (USA)

EIA RS 232	Interface between data terminal equipment and data communications equipment employing serial binary data interchange
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International Standards Organisation

RJ11	Four core telephone and data connector
RJ45 (ISO 8877)	Eight core data connector (used in 10 Base T data wiring systems)

Civil Aviation Authority



OP 15

Minimum performance specification for vhf(am) transmitters and receivers

Institution of Electrical and Electronic Engineers (USA)

IEEE 802.3

Carrier Sense Multiple access and Collision detection (CSMA/CD) access method and physical layer specifications

