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GP 59-82

Public Address-General Alarm and Emergency Broadcast Systems

Group Practice

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This revision of Engineering Technical Practice (ETP) GP 59-82 is ordered to indicate the criteria that are involved when designing a facility public address/general alarm or emergency broadcast system. The table of contents has been fully revised to enable quick reference to relevant sections. The design section has been rewritten to include specific details for marine, offshore, and onshore. Marine includes mobile drilling offshore drilling rigs and FPSO requirements. A bibliography has been added and expanded to cover the latest available published standards and regulations. Because of the extent of revisions they are not specifically identified herein.

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1. Scope

This GP provides for the design of facility public address/general alarm (PAGA) and emergency broadcast systems. Although examples may be given specific alarm sounds, coloured indicators, and event triggers are not fully defined in this document as they vary between regions. Efforts should be made to agree the events, audible alerts, and coloured indicators for alarms across a segment area to ensure the greatest possibility of safety and consistency.

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

American National Standards Institute (ANSI)

S3.2 Method for Measuring the Intelligibility of Speech over Communications Systems.

BP

GP 32-20 Site Inspection, Testing, and Commissioning.

British Standards Institute (BSI)

BS EN 60849 Sound systems for emergency purposes.

International Electrotechnical Commission (IEC)

IEC 60268-16 Sound system equipment – Part 16: Objective rating of speech intelligibility by speech transmission index.

IEC 60849 Sound systems for emergency purposes.

IEC 60896-22 Stationary lead-acid batteries – Part 22: Valve regulated types – Requirements.

International Maritime Organisation (IMO)

SOLAS Safety of Life at Sea.

International Standards Organization (ISO)

ISO/TR 4870 Acoustics - the Construction and Calibration of Speech Intelligibility Tests.

NORSOK

NORSOK T-100 Telecom Subsystems.

3. Definitions/abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

ACE Advanced Collaborative Environment



Emergency Broadcast audio messages broadcast during an alarm. They may be pre-recorded for each specific alarm or manual informative announcements as required during the event

ICSS Integrated Control & Safety System (DCS – F&G – ESD)

IP System Rating Ingress Protection System – rating system that has two numbered components which rate equipment for protection against solid particles and water penetration

IPT Internet Protocol Telephony

MODU Mobile Offshore Drilling Unit

NAI Normally Attended Installation

NUI Normally Unattended Installation

PABX Private Automatic Branch Exchange (Facility phone system) similar to PBX

PAGA Public Address/General Alarm system

PAPA Prepare to Abandon Platform Alarm

PBX Private Branch Exchange (Facility phone system) similar to PABX

PTT Push To Talk – button used to initiate a voice transmission. Transmission only occurs while the button is depressed

SIL Safety Integrity Level – indication of the protection and resilience a system needs based on the potential damage if it failed

SPL Sound Pressure Level – method of measuring the volume of an audio signal

SPU Strategic Performance Unit

UPS Uninterruptible Power Supply – battery backup for maintaining power if utility power fails

4. Design considerations

PAGA systems shall be used to notify personnel of a hazardous situation and of appropriate actions to take to ensure an orderly, safe evacuation of an area if needed.

Public Address with Emergency Broadcast systems are used to give voice announcements to supplement the information available with a standard bell/siren based alarm system.

There are different international, governmental, and federal standards covering Public Address and Alarm systems. However, in most instances they require a design that is resilient to failure of loudspeakers, cabling, or electronics irrespective of the installation being onshore or offshore.

4.1. General requirements

4.1.1. Alerting personnel

- a. There must at all times be a method of alerting personnel to an incident.



- b. On failure of all alerting systems the facility must be evacuated

Operation/occupancy may be possible with limited personnel equipped such that they can be individually informed of an incident. This can only be approved under HSSE procedures and compliance with local and national HSE rules and fire regulations.

4.1.2. Local regulatory compliance

Local regulations specifying types of alarms and alarm systems must be followed in addition to this guidance.

Alarm sounds, flashing beacon colours, backup power requirements may be different due to regulations applicable in the area of operation.

4.1.3. Combining alarm and voice announcement systems

The Emergency Broadcast and General Alarm functionality should be combined into a PAGA irrespective of location.

Exceptionally a stand-alone Emergency Broadcast system may be permitted in offices where there is 100% alarm coverage provided by sirens/bells/klaxons connected to the building fire alarm system. Such a system still has to meet resilience and design consideration elsewhere in this document.

4.1.4. Routine voice broadcasts

The Public Address should be used to broadcast routine voice messages and supplement other communications methods available on the facility where an announcement needs go to all personnel on, or in a specific area within, the facility.

4.1.5. Design factors by facility type

- a. There should be fully resilient PAGA systems installed that have no common mode failure points.
- b. Onshore industrial facility
 - 1. These must, at a minimum, meet local regulations.
 - 2. System shall take into account the size and type of facility.
 - 3. There shall be sufficient coverage of the alarm signals such that they can be heard throughout the affected and adjacent areas even if sounders have been disabled due to the event.
 - 4. PA/Emergency Broadcast shall be provided to normally occupied areas, escape routes and muster areas.
 - 5. It may not be possible on large industrial facilities to provide 100% voice coverage but 100% alarm indication shall be provided.

Control rooms, laboratories, workshops, warehousing are for PAGA purposes classified as part of the facility and not an office.

If the site is adjacent to others (industry, housing, hospitals, schools....) careful design is required to avoid any noise nuisance due to sound spill over.

- c. Onshore office/accommodation
 - 1. These must, at a minimum, meet local regulations.
 - 2. If the office is located within the boundary fence of a processing/production facility, although located outside of any process area, it should be connected to the facility PAGA system.



3. The PA zones and alarm types that are sounded in these areas should be decided during HAZOP reviews.
4. If there is accommodation included in a multi-use facility (plant/offices/accommodation) the design shall take into account the different working practices and patterns to ensure that routine announcements are not heard in areas where they will cause a nuisance, i.e. sleeping areas and adjacent corridors.

This is to ensure that only relevant announcements are heard in the area. Process announcements being broadcast into a general office may be unnecessary and cause a nuisance to personnel. Similarly routine announcements waking shift staff due to incorrect zoning and placement of loudspeakers are a nuisance.

d. Offshore fixed or floating production facility (NAI)

1. Two independent PAGA systems should be installed.

Duplication or high resilience single system is a topic that can be discussed, however, when cost of high resilience system i.e. SIL3 is factored along with certification, maintenance and recertification on changes there may be little benefit over a fully duplicated system.

If there is a need for a "Page Party" system this may be integrated into the PAGA and become one of the two systems.

Duplicated systems ensure that there are at least two independent speaker loops covering each PAGA zone.

2. Systems shall be synchronised such that all alarms and announcements are broadcast simultaneously across them.
3. The cabling for loudspeakers and beacons shall be separated from each independent system wherever possible.
4. Fire resistant cable shall be used where cables cannot be separated.
5. Speaker loops shall have independent and dedicated amplifiers.
6. Due to noise levels it may not be possible to provide 100% voice coverage but 100% alarm coverage shall be provided.
7. There shall be a separate zone for sleeping areas and associated corridors.
8. When a facility is designed such that a drilling rig is temporarily placed over the well bay area for drilling or workover operations there shall be an interface point so that alarms on the facility and MODU are signalled between each other and automatically initiate alarms as required.

e. Offshore NUI

1. If there is no temporary refuge or offices the alarm functionality may be provided using sounders connected directly to ICSS and portable loudhailers/bullhorns.
2. If there is a temporary refuge that can be used for overnight stays then the requirements for an NAI shall be met.

f. MODUs.

1. These must, at a minimum, comply with IMO SOLAS (MODU) requirements.
2. When a MODU is positioned over the wellbay area for drilling and workover operations there shall be an interface point so that alarms on the facility and MODU are signalled between each other and automatically initiate alarms as required.

g. Marine Vessels.

1. These must, at a minimum, comply with relevant IMO SOLAS requirements.

