

Engineering Standard

SAES-T-603

31 March, 2004

Telecommunications - Safeguards and Warning Devices

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Saudi Aramco DeskTop Standards

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I Scope

This Standard prescribes Mandatory Requirements governing the use of safeguards and warning devices in the construction of telecommunication outside plant (OSP) facilities.

II Conflicts and Deviations

Any deviations, providing less than the mandatory requirements of this standard require written waiver approval as per Saudi Aramco Engineering Procedure [SAEP-302](#).

III References

All referenced Specifications, Standards and Codes, Forms, Drawings and similar material shall be of the latest issue (including all revisions, addenda and supplements) unless stated otherwise. Applicable references are listed below:

A. Saudi Aramco References

Saudi Aramco Engineering Procedure

[SAEP-302](#)

*Instructions for Obtaining a Waiver of a
Mandatory Saudi Aramco Engineering
Requirement*

Saudi Aramco Engineering Standard

[SAES-T-628](#)

Underground Cable

Saudi Aramco General Instructions

GI-0002.100

Work Permit System

GI-0002.708

Gas Testing Procedures

GI-1021.000

*Street and Road Closure, Excavations,
Reinstatement and Traffic Controls*

Construction Safety Manual

Ministry of Transportation-Highway Design Manual

B. Industry Codes and Standards

GTE

General Telephone and Electronics

IV Modifications to GTE 603 Series

4 DESIGN

The following paragraph numbers refer to GTE 603 Series "Safeguards and Warning Devices", which is part of this standard. The text in each paragraph below is an addition, exception, modification, or deletion to GTE 603 as noted. Paragraph numbers not appearing in GTE 603 are new paragraphs to be inserted in numerical order.

4.1 GTE Section 603-009-500: Removing Petroleum Products from Manholes and Underground Conduit Systems; Issue 1/April, 1984

4.1.1 General

4.1.1.1 Paragraph 1.01 - This section provides the:

- Procedures for removing petroleum products (e.g., gasoline, diesel fuel) from manholes and underground conduit systems, before any work can start.
- Precautions that should be followed to avoid accidents.

4.1.2 Reference Material

4.1.2.1 Paragraph 2.01: In order to safely perform the procedures outlined in this section, the craft personnel must be familiar with the information contained in the following sections:

<u>SAES-T-603</u>	<i>Safeguards and Warning Devices</i>
<u>SAES-T-628</u>	<i>Paragraph 4.4 Underground Cable Installation Precautions Paragraph 4.6, Testing and Ventilating Manholes</i>
<i>GTE 081</i>	<i>Blowers, Heaters, Pumps, Tools - Outside Plant</i>
<i>GI-0002.100</i>	<i>Work Permit System</i>
<i>GI-0002.708</i>	<i>Gas Testing Procedures</i>
<i>GI-1021.000</i>	<i>Street and Road Closure: Excavations, Reinstatement and Traffic Controls</i>

4.1.3 Responsibilities:

4.1.3.1 Paragraph 2.03: A Saudi Aramco supervisor must directly supervise all petroleum products removal work performed by Contractor at the job site. In the event of gas detection in the work area, all workmen must

immediately leave the work area and the incident reported to the work permit issuer. Workmen may not re-enter the work area until the area is cleared and a new work permit is issued.

4.1.3.2 Paragraph 2.04 - The petroleum proponent is responsible for locating and clearing the source of a petroleum spill or leak.

4.1.4 Paragraph 3 - Removing Petroleum Products from Underground Conduit System.

4.1.4.1 Paragraph 3.01 - When petroleum products are found in a manhole, inspect the area to determine the:

- Slope of the terrain.
- Probable number of manholes involved.

Warning:

Fumes from petroleum products may be toxic and highly flammable. As a result:

- Do not enter the manhole until tests with a portable gas detector show the atmosphere is safe. Refer to GI-0002.708, Gas Testing Procedures and GI-0002.100 Work Permit System. Continuously ventilate the manhole with a power blower to keep the atmosphere safe.

Commentary Note:

See [SAES-T-628](#), paragraph 4.6, Manhole Testing and Ventilating

- While working around the manhole, avoid breathing the fumes or causing a spark, which may ignite the product.

4.1.5 Initial Inspection

4.1.5.1 Paragraph 3.03 - If it is determined that a manhole contains a petroleum product, the following procedures should be followed:

1. Stop work and notify the work permit issuer, Saudi Aramco Fire Prevention Engineer, the responsible Saudi Aramco Project Engineer and Communication Operations & Maintenance Department of the existing manhole's condition and location.
 2. Warn people passing by of the danger until the proponent, Security or Loss Prevention Department takes charge.
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3. Ensure that the work area warning devices are proper and adequate.
 4. Do not enter the manhole until it has been declared safe by proper authorities and a new work permit has been issued.
- 4.1.5.2 Paragraph 3.04 - The Loss Prevention Department or other departments having jurisdiction will usually:
- Direct further work required to remove the petroleum product.
 - Inspect and analyze the product to determine its source.
 - Perform any other procedure deemed necessary.
- 4.1.5.3 Paragraph 3.12 - Plug the ducts and begin construction after the manhole and ducts, if involved, have been:
- Flushed.
 - Pumped.
 - Made safe for entry (i.e., tested and ventilated) and
 - A new work permit issued.
- 4.1.5.4 Paragraph 3.13 - For procedures on how to complete trouble restoration refer to this GTE paragraph.
- 4.1.5.5 No work can be done in the manhole(s) until the source of the petroleum product has been identified, the leak stopped and authorization to proceed has been obtained from the Loss Prevention Department. In addition a new work permit must be issued.
- 4.2 GTE Section 603-020-101, Detector and Monitor, Combustible/Toxic Gas and Oxygen Deficiency.
- 4.2.1 (Addition) Gas Testing and Instruments use must comply with Loss Prevention Department Procedures. Refer to GI-0002.708 including Supplements 1, 2 & 3.
- Supplement 1 - Use of Bacharach Model K-25 Oxygen Indicator.
- Supplement 2 - Use of J-W Sniffer Model G Combustible Gas Indicator.
- Supplement 3 - Use of Drager Multi-Gas Detector - H₂S Testing.

Commentary Note:

Any additional Gas Testing Instruments (Models) used must be approved by Loss Prevention Department.

- 4.3 GTE Section 603-050-010, Removing and Replacing Manhole Covers Safe Working Methods.
- 4.3.1 Safety Precautions
- 4.3.1.1 Page 2 - Take the following precautions when removing or replacing manhole covers:
- Before removing manhole covers, be sure the proper safeguards and warning devices have been placed to adequately protect the location against accidents. Refer to GI-1021.000.
 - Conduct the prescribed atmospheric gas testing and ventilating of the manhole as described in GI-0002.708, including Supplements 1, 2 & 3 and [SAES-T-628](#).
 - Removing a manhole cover should never be attempted without a standard manhole hook on hand. Proceed as outlined in GTE-603-050-010, page 7 but use extreme caution since many existing manhole covers are non-standard. Never use a large screw-driver, pickax or crow-bar when attempting to remove the cover. Non-standard covers should be replaced.
 - Never leave an open manhole unattended for even a short time. Always replace the cover before removing guards and warning devices.
 - Manhole covers are heavy and must be handled with care to avoid personal injury. When handling a cover, keep your feet solidly placed and positioned so they will be clear of the cover if you drop it.
 - Do not use an open flame in or around a manhole or over a manhole cover. An open flame is hazardous because of the possibility of an explosion if a combustible mixture is present in the manhole.
- 4.4 GTE Section 603-060-010, Safeguards To Be Taken Before Climbing Poles
- 4.4.1 Paragraph 4.01 (Addition) - Before poles are climbed, a visual check must be made for pole conditions such as; Leaning of a pole, evidence of collision damaged pole, broken or loose wire & guys, contact of power wires or other plant on the pole.
- 4.4.2 Paragraph 6.01 - Poles found to be unsafe or that are suspected of being unsafe to climb or work on, shall not be climbed and are to be reported to immediate supervisor. A danger sign (GTE Section 603-060-010, Issue 4, Page 5, Figure 4) shall be used to warn against the hazards of climbing the pole. The danger sign must be placed below the pole number and facing oncoming traffic.
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- 4.4.3 Paragraph 6.02 - If the pole has been broken, resulting in an unsafe condition and requiring immediate support, steps should be taken to warn the passerby.

Commentary Note:

All personnel who will be climbing or working on poles shall review the GTE Section 603-060-010 and the Construction Safety Manual, Section IV, paragraphs 1.6 and 1.6.11.

- 4.5 GTE Section 603-225-011, Safeguard & Warning Devices, Guarding Work Areas - Underground, Buried & Aerial Plant

4.5.1 General

- 4.5.1.1 Paragraph 1.01 - This section provides general information relative to guarding work areas which are potentially hazardous to vehicular or pedestrian traffic.

- 4.5.1.2 (Addition) Refer to GI-1021.000 and Schedule "D" of the Saudi Aramco Construction Safety Manual. They outline the instructions and procedures to be used during street and road closures, excavations, and traffic controls.

4.5.2 Warning Devices

- 4.5.2.1 Paragraph 2.01 - The following paragraphs describe the work area guards and warning devices which are to be used by telecommunication personnel at work locations involving underground, buried, or aerial plant.

4.5.2.2 Personnel Protective Equipment

- 4.5.2.2.1 Paragraph 2.02 - (Addition) Protective equipment is to be worn by personnel during highway flagging Operations or whenever the work area exposes personnel to hazardous traffic conditions. Refer to GI-1021.000 and Schedule "D" of the Saudi Aramco Construction Safety Manual.

4.5.2.3 Work Area Guards

- 4.5.2.3.1 Paragraph 2.05 - Manhole guards (Figure 1) are to be used to guard open manholes and other small obstructions. This unit is constructed of 3/4-inch pipe painted yellow. The "No Smoking" sign must also be attached to all manhole guards. The manhole ladder (if used) should be placed so that the worker faces oncoming traffic during entrance to or exit from the work area. Refer to Section II paragraph 9.1.4 and 9.2 in the Saudi Aramco Construction Safety Manual.
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- 4.5.2.4 Paragraph 2.06 - The manhole shield (Figure 2) may be installed to keep water and windblown trash out of the manhole. One size fits 27-inch or 30-inch manholes by merely turning the shield over.
 - 4.5.2.5 Paragraph 2.07 - Warning standards, 'Men Working', with Yoke and Flag (Figure 3; GI-1021.000) are to be used to alert oncoming traffic to the presence of telecommunication personnel.
 - 4.5.2.6 Paragraph 2.10 - The red warning flag (Figure 4; GI-1021.000) is the most common signaling device used during daylight hours. It shall be used by flaggers to direct traffic or placed in the yoke of the warning standards.
 - 4.5.2.7 Paragraph 2.11 - The reflectorized traffic cone [Figure 5, Saudi Aramco Material Stock (SAMS #) 21-568-773-00] shall be used to provide motorists with advance notice as they approach work areas, or to guide traffic into restricted channels around a work area with a minimum of congestion.
 - 4.5.2.8 Paragraph 2.12 - A barricade (Figure 6, GI-1021.000) shall be used to warn and alert drivers of hazards created by work activities in or around the traveled way. A flasher is mounted on the traffic side for use during darkness or low-visibility conditions. Barricades and flashers used in plant areas must be approved for location of use.
 - 4.5.3 Signs and Symbols
 - 4.5.3.1 Paragraph 3.01 - Signs and symbols that are most commonly used to warn oncoming traffic of an approaching work area are essentially those contained in GI-1021.000 and the Saudi Aramco Construction Safety Manual.
 - 4.5.3.2 Paragraph 3.03 - Commonly Used Road Construction Signs are 900 by 900 mm (36" by 36") in size. Refer to GI-1021.000 and the Kingdom of Saudi Arabia Ministry of Transportation-Highway Design Manual.
 - 4.5.4 Precautions
 - 4.5.4.1 Paragraph 4.08 - A flagger(s) shall be used at all times when the work operation restricts traffic flow or obscures visibility.
 - 4.5.4.2 Paragraph 4.10 - Warning devices shall be arranged so that they do not create a hazard for pedestrians.
 - 4.5.5 Job Presurvey
 - 4.5.5.1 Paragraph 5.05 - At busy intersections of highways and roads or other heavy traffic locations, the supervisor shall presurvey the locations and discuss the
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protection plan indicated in Saudi Aramco Construction Safety Manual with the work force before work is started.

4.5.5.1.1 (Addition) Contact Saudi Aramco Road Division's traffic engineer for advice in developing detour, flagging Operations and signing plans. Refer to GI-1021.000.

4.5.8 Paragraph 8 - Control Device Applications

4.5.8.1 (Addition) Refer to Saudi Aramco Construction Safety Manual and GI-1021.000 for application of traffic warning devices when work is underground, buried plant and aerial plant work on Saudi Aramco roads, off-road, streets and alleys. A typical example is shown in (Figure 7).

V Installation

Installation of safeguard and warning devices shall be in accordance with this standard, the Construction Safety Manual, GI-1021.000 and other applicable standards.

VI Testing and Inspection

- A. The Saudi Aramco Inspection Department will inspect the installation of all sign and barricade placements per paragraph 5 above.
- B. Gas Testing Procedures shall be in accordance with GI-0002.708 including Supplements 1, 2 and 3.

Revision Summary

31 March, 2004

Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with minor revision.

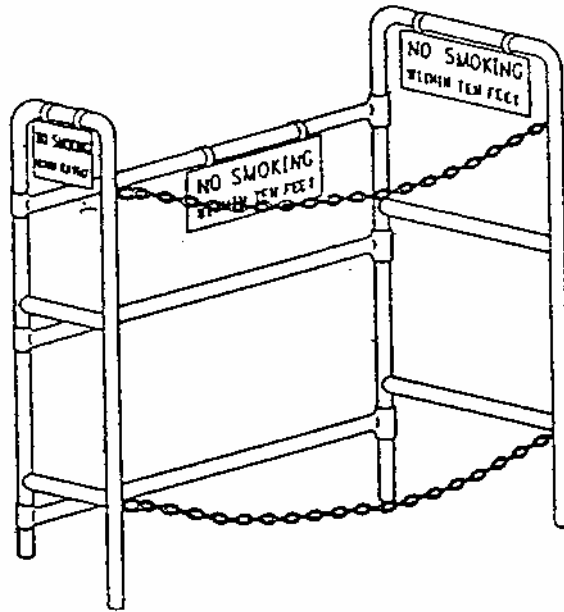


Figure 1 - Manhole Guard (No Smoking Sign)

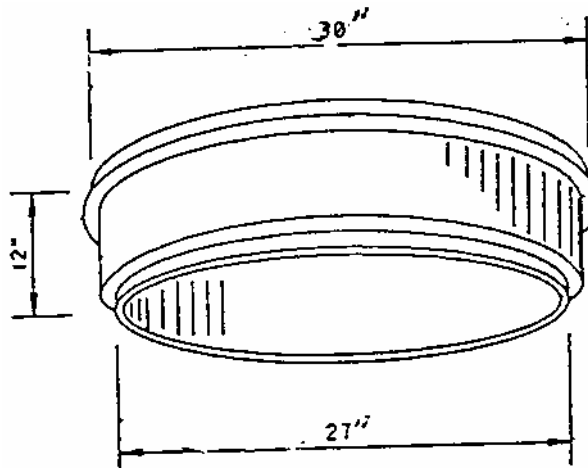


Figure 2 - Manhole Shield

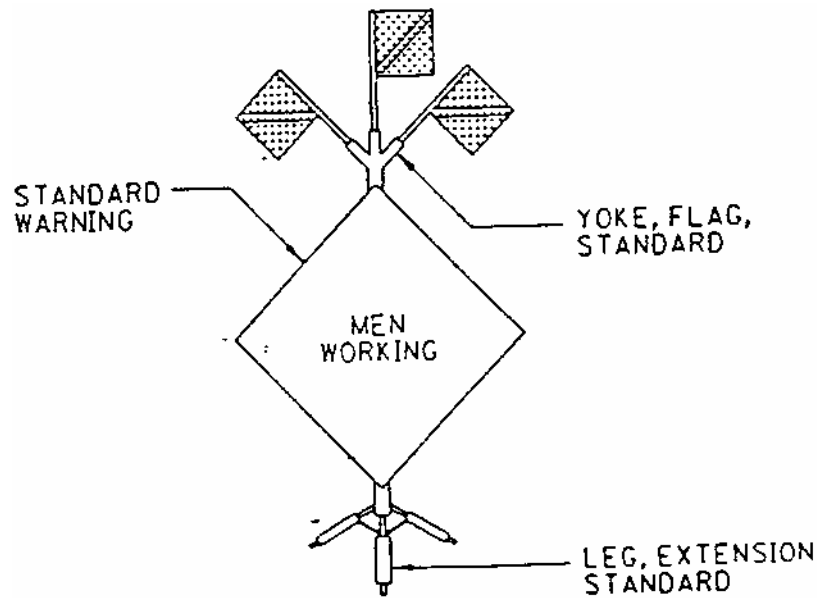


Figure 3 - Warning Standard

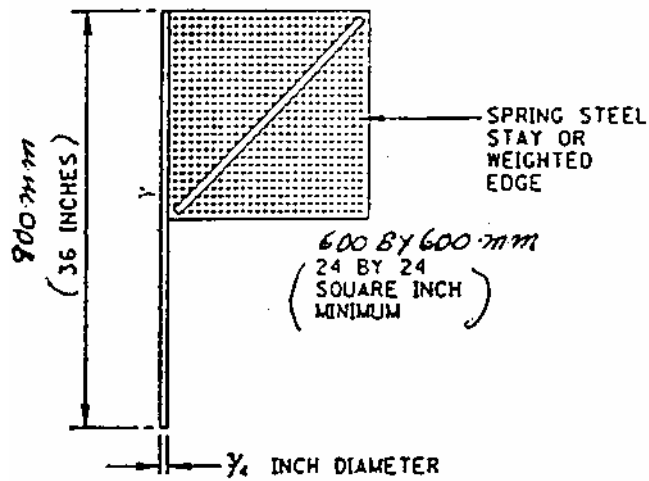


Figure 4 - Red Warning Flag

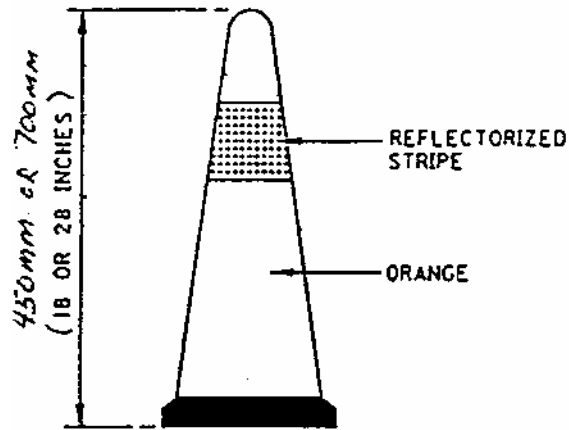


Figure 5 - Traffic Cone

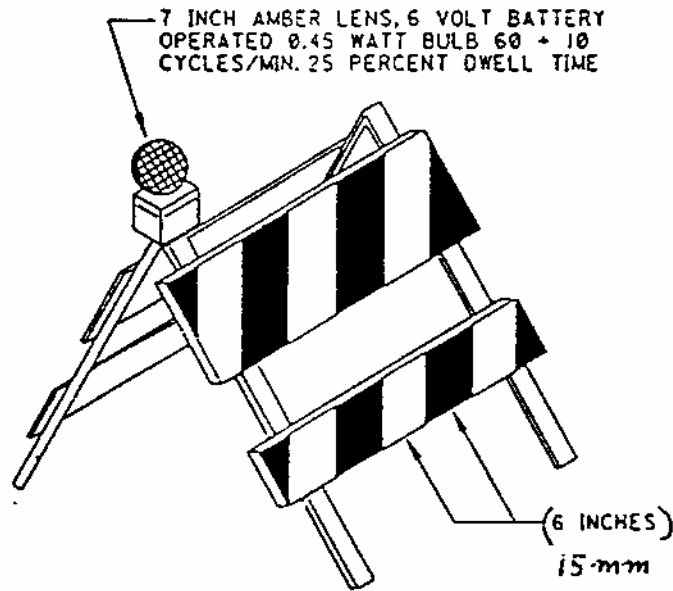


Figure 6 - Portable Barricade

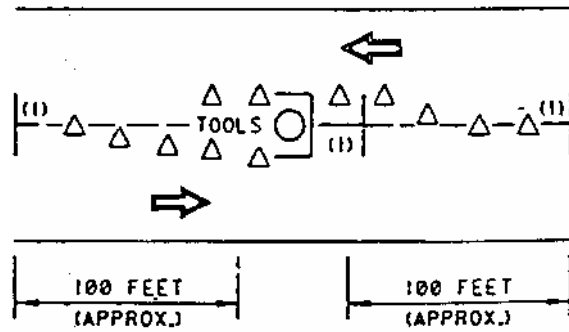


Figure 7 - No Cars Parked at Curbs