PASSENGER RAIL AGENCY
OF SOUTH AFRICA

SIGNALLING INSTALLATIONS:

MINIMUM GUIDELINES FOR ANTI-VANDAL MEASURES

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1. PURPOSE

The purpose of this document is to serve as a minimum guide to secure / protect the various Signalling & Telecommunication equipment from being exposed to theft and vandalism. The current anti-vandal equipment installed on various Prasa Rail Network Regions: Gauteng, Kwa-Zulu Natal and Western Cape are listed on the document, with a few external products, and these should be considered as the bare minimum requirements.

2. SCOPE

This document outlines the list of anti-vandal equipment currently installed within PRASA Rail Network, the installation processes and procedures are not captured/ described since the equipment will differ from one solution to another. The proposed solution should include detailed information proposals, including but not limited to: equipment durability test, installation procedures, life span, market spares availability, maintenance etc.

3. VARIOUS SIGNALLING EQUIPMENT ANTI - VANDAL PROTECTION

3.1 Signaling Equipment Rooms (SER's / AR's)

- The following shall be considered when enhancing/ improving safety on SER's.

3.1.1 Fencing:

- Palisade, Clear view, with concrete foundation to prevent digging under the fence, etc.

3.1.2 Intruder / Early warning detection systems

- The system shall be remotely monitored from an operational security center.
- The system shall be able to detect an intruder at the fence area before they reach the SER's.

3.1.3 Air conditioner

- The system shall be the type without condensers exposed outside the SER's / AR's.

3.2 SER's Building

- A typical old Relay Rooms (Photo 1) (brick buildings) shall be replaced with reinforced concrete structure as shown in Equipment / Apparatus Rooms (Photo 2).
- Space inside or alongside the equipment room shall be adequate to accommodate a Diesel Generator where applicable.
- Further examples and Bunker proposals in pictures below.

Photo 1: Old type Relay Room

Photo 2: Proposed New type Equipment Room

3.2.1 AR's Building

- The following should be considered for AR's building with reinforced concrete structure.

Photo 3: Apparatus Room type proposal with reinforced concrete

Photo 4: Typical Air condition without condenser on the outside

3.2.2 Further examples used by others to be considered.

Photo 5: Bunker type solution Equipment / Apparatus Room example – note fencing.

Photo 6: Bunker type solution Equipment / Apparatus Room example

3.3 Safety Door

All SER's / AR's shall be equipped with safety doors with the following features:

- Door hinges shall be inside the enclosures or door frame cavity.
- The door frame shall be strengthened by reinforced concrete pillars inside.
- Locking mechanism and keys shall be approved by PRASA
- Locking mechanism to be a "safe type" which locks/slide embeds into the door frame.

Photo 7: Single Door Type

3.4 Points Machines

All the points machines shall be equipped with the following features:

- Points machines to be secured with approved anti-vandal lid and appropriate locking mechanism or enclosed with a “robust cage.”
- Points Junction box to be eliminated and cable connected directly into the machine at a 90-degree angle downwards into a pipe into the ground.

Photo 8: Points Machine requires a reinforced Lid & elimination of Junction Box

Photos 9: Typical Robust cage

3.5 Signals

3.5.1 Signal junction Box

- Signal junction box to be protected with anti-vandal galvanized enclosure.

3.5.2 Cabtyre

- Cabtyre and light units at the rear of the target to be protected with anti-vandal galvanized enclosure.

3.5.3 Signal base

- Cable protection between base & concrete biscuit shall be protected with anti-vandal robust enclosure.
- Signal base bolts shall be protected with anti-vandal robust enclosure.

Photo 10: Signal: Signal Cable Base/ Concrete Protector Bolt cover protection

3.6 Track Vacancy Detection Enclosures (Axle Counters)

The axle counter equipment protection shall include but not limited to:

3.6.1 Axle counter head protection

- Axle counter head protection covers shall be made of fiber glass/ Kevlar and shall be of fire-retardant material.

3.6.2 Cables protection (Silo to the head)

- Cable protection shall include non-bendable non destructible hard green HDPE Nextube pipe galvanized Sprague conduit.

3.6.3 Az Inserts enclosure (Silos)

- Double ring silos filled with reinforced concrete (25 MPA) between the two rings.
- Silo lids shall be anti-vandal and flush mounted on top of the silo and appropriate tamper proof locking mechanism.

Photo 11: Axle Counter Enclosure: Silo

Photo 12: Axle Counter Enclosure: Silo

Photo 13: Axle Counter Equipment: 2 types of Kevlar cover Head protection

3.7 Underground Signalling Cables

The protection or securing of underground copper cables shall include but not limited to:

- Cable to be placed on top of the Styrofoam blocks with 300mm spacing.
- Pouring of concrete mix with a strength of **(25 MPA)** minimum.
- Concrete thickness shall be minimum of 300mm.
- This is applicable to all underground cables main and tail cables.

Photos 14: Cable trench with concrete mix

4. General

This document shall be read in conjunction with the provided project scope of work and Particular Technical Requirements (PTR) specifications outlined and detailed on the specific Request for Proposal (RFP).

Bidders shall source or provide their own companies practical, cost efficient, workable Anti vandal protection product design solutions based on the examples provided in the document for final approval by PRASA before construction. Some of these designs are available and approved from PRASA.