

# SAFETY CIRCULAR ON USE OF SOCKET-OUTLET ASSEMBLY IN CONSTRUCTION AND BUILDING SITES



By Occupational Safety & Health Division  
Ministry of Manpower

## INTRODUCTION

The CP 88 : 2001 : Part 1 is the Code of Practice for temporary electrical installations in construction and building worksites.

Compliance with this CP is mandatory for temporary electrical installations for building operations and works of engineering construction under the Workplace Safety & Health (Building Operations and Works of Engineering Construction) Regulations as well as the Electricity (Electrical Installations) Regulations.

## SOCKET-OUTLET ASSEMBLY (SOA)

One of the key recommended practice in the CP 88 is the use of socket-outlet assembly (SOA). The SOA enables users to tap electricity supply safely at the location where work is to be carried out, thus avoiding the need to run long trailing wires for each appliance. The SOA can be a metal or plastic cabinet or a portable box in which the various electrical protective devices are housed. It is typically equipped with up to 9 single-phase industrial socket-outlets or up to 3 three-phase socket-outlets. SOA can also have the combination of 3 single-phase socket-outlets and 3 three-phase socket-outlets.

These industrial socket-outlets allow for the connection of portable electrical equipment such as electrical hand tools, lamps, and water-pumps, etc.

Thus, it is necessary for each and every piece of portable electrical equipment to be connected up using only industrial plug. This enables the equipment to be

Furthermore the Workplace Safety and Health (General Provisions) Regulations stipulates that it shall be the duty of the occupier of a worksite to ensure that every electrical installation and electrical equipment in the worksite is of good construction, sound material and free from defects; and is used and maintained in such manner so that it is safe for use. The occupier shall also take all reasonably practicable measures to protect any person against the risks of electric shock arising from or in connection with the use at work of any electrical installation or equipment in the worksite.

plugged directly into the industrial socket outlet fitted on the SOA.

The SOA has to be manufactured in accordance with the requirements specified in the CP 88. It can be designed for wall mounting or fitted with castors so that it can be moved around in the worksite.



*Fig. 1 – This photograph shows a wall mounted SOA with uncluttered electrical cables connected to industrial socket-outlets using industrial plugs. All live parts are fully enclosed.*

## PURPOSE OF THE SOA

The intention for the use of the SOA is to ensure a more systematic and safe approach in the setting up of temporary electrical installations in a worksite.

Providing electrical supply to portable electrical equipment on an ad hoc basis in a haphazard manner was a common unsafe practice in the construction industry. Very often, it was also found that 'Do-It-Yourself' distribution boards (**DBs**) and extension socket-outlets do not comply with the safety requirements. Such unsafe practices had led to many electrical accidents, examples of which are illustrated by the following case studies.

### CASE STUDY #1

A worker, while positioning a water pump, was electrocuted when he came into contact with an exposed 'live' conductor at the PVC insulation taped joint of the water pump. Investigation revealed that the electrical installation was not protected by a Residual Current Circuit Breaker (RCCB).

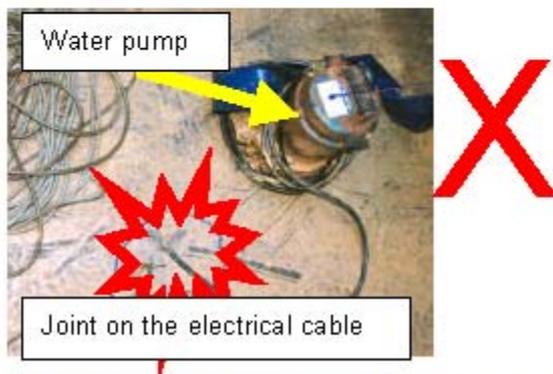


Fig. 2 – This photograph shows the water pump and the PVC insulation taped joint. (joint was opened up for investigation).

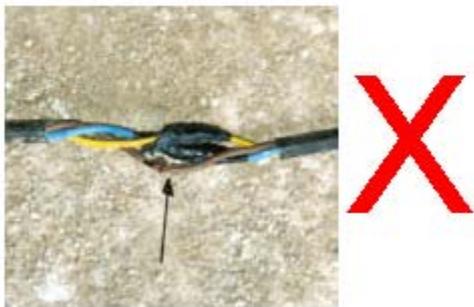


Fig. 3 – This photograph shows a typical connection commonly found at worksite that caused the accident.

### CASE STUDY #2

A worker was electrocuted when he handled a lit spotlight in a building under construction. Investigation into the accident revealed many faults on the electrical installation that supply electricity to the spotlight. This includes incorrect connection of wires to the isolator, improper jointing of cables and improper use of plugs and socket-outlets. To make matter worse, the deceased was working on a wet floor.

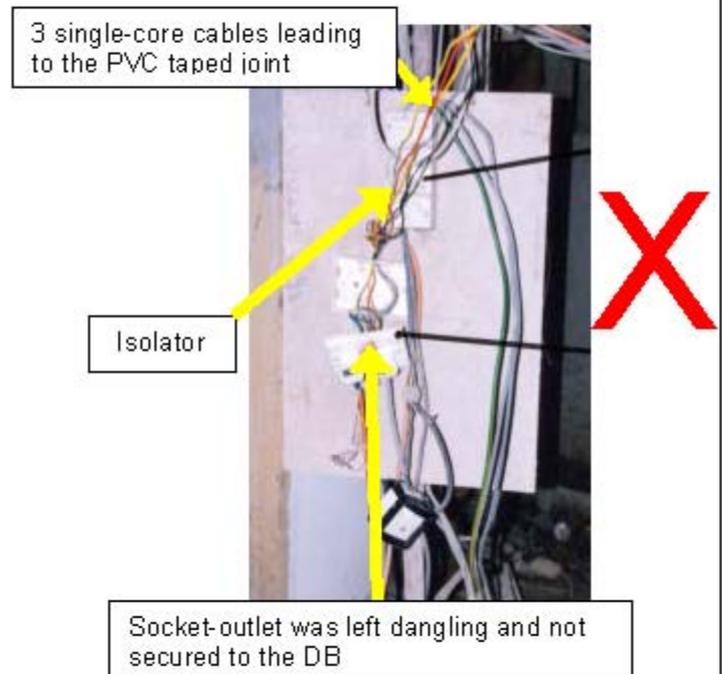
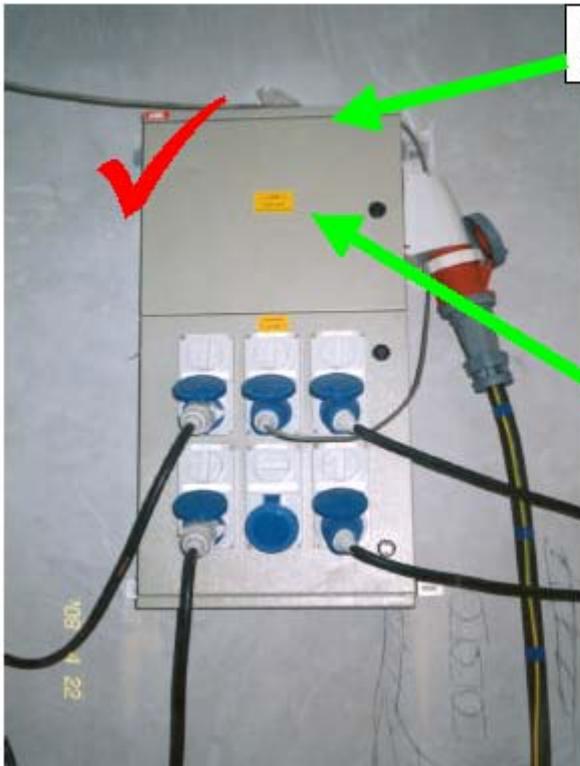


Fig. 4 – This photograph shows DB that was poorly constructed. The electrical installation was not effectively earthed. The socket-outlet was found to be defective.

From the foregoing case studies, it can be seen that accidents occurred as a result of the haphazard unsafe temporary electrical installations using makeshift DBs, extension socket-outlets and cables. Such accidents could be prevented if the SOAs had been used.

## IMPORTANT POINTS TO NOTE WHEN USING SOA

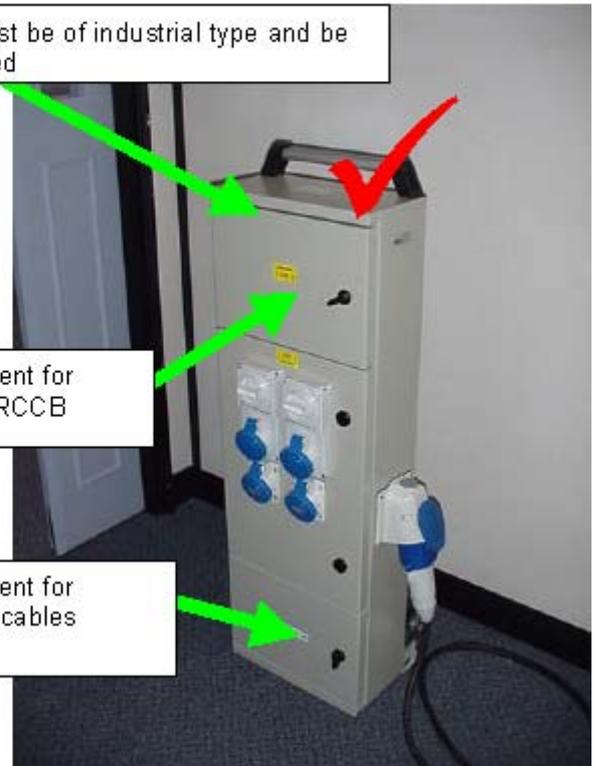


*Fig. 5 – This photograph shows a typical wall mounted SOA.*

Enclosure must be of industrial type and be totally enclosed

Compartment for MCB and RCCB

Compartment for storage of cables (optional)



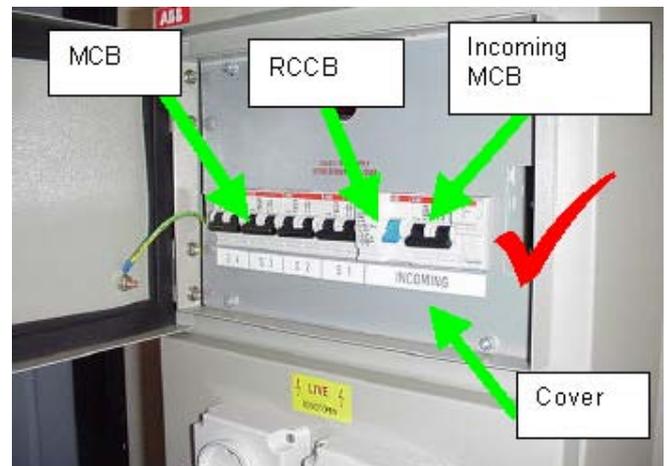
*Fig. 6 – This photograph shows a typical floor standing SOA*

### ENCLOSURE

- ❖ SOA must be totally enclosed with all live parts protected from direct contact.

### CIRCUIT BREAKERS

- ❖ Socket-outlets on the SOA must be incorporated with:
  - MCBs** (Miniature Circuit Breakers) – for overload protection of each circuit in SOA
  - RCCB** (Residual Current Circuit Breaker) – for earth leakage protection



*Fig. 7 – This photograph shows the circuit breaker inside the SOA.*

### INDUSTRIAL PLUGS & SOCKET-OUTLETS

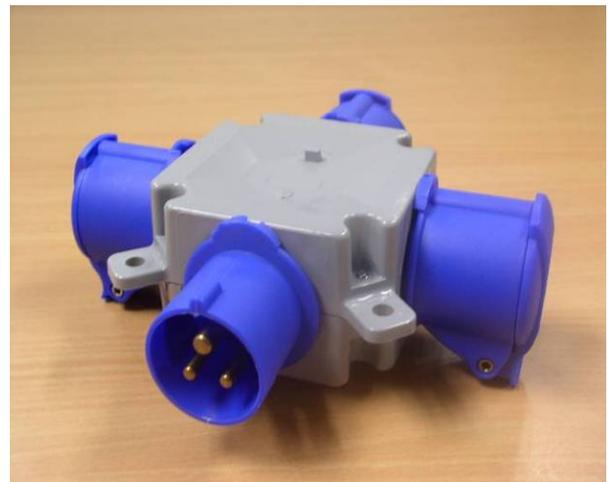
- ❖ All plugs, socket-outlets and cable couplers shall comply with the requirements of IEC 60309.
- ❖ All industrial plugs, socket-outlets and cable couplers must be identified by the colour code given in Table 1.

Operating Voltage (V)	Colour	Examples
55	White	
110	Yellow	
230	Blue	
400	Red	

Table 1

## PORTABLE ELECTRICAL EQUIPMENT

- ❖ Flexible cables used for portable electrical equipment such as hand-held tools must not exceed 3 metres or such other length as supplied by the manufacturer.
- ❖ Multiple socket outlet adapters such as that shown in Figure 8 do not conform to any IEC standards and shall not be used. **The use of such adapters can lead to overloading of the electrical circuit and electrocution.** Hence, it is not safe to use such adapters.
- ❖ All socket-outlets assembly for the connection of any portable electrical equipment at worksites must be constructed in compliance with the requirements of CP 88 : Part 1 :2001, Code of Practice for Temporary Electrical Installations for Construction and Building Sites.



*Fig.8 – Multiple socket outlet adapters such as shown in this photograph do not conform to any IEC standards and are not safe for use*

## INSPECTION BY LICENSED ELECTRICAL WORKER

- ❖ All temporary electrical installations (including the SOA) have to be inspected and certified fit for use or operation by an appropriate class of Licensed Electrical Worker (LEW) before connecting to the source of electricity supply. Thereafter the installation shall be inspected at least once a month by the LEW. The inspection, testing and maintenance of the electrical installations must comply with the requirements of CP88 Part 1:2001.