3.4: Classification of Bus Bar

The bus bar arrangements are classified into the following categories

- (a) Single bus bar scheme
- (b) Single sectionalized bus bar scheme
- (c) Double bus bar single breaker scheme
- (d) Double bus bar double breaker scheme
- (e) Breaker and half scheme
- (f) Mesh scheme
- (g) Main and transfer bus scheme

(a) Single bus bar scheme

![Diagram of single bus bar scheme]

Fig:3.1: Single bus bar scheme

In this scheme there is only one 3p bus to which the various incoming and outgoing circuits are connected. Maintenance of such a bus bar without interrupting of supply is impossible. For major substations this scheme is not
useable and can be used only where loads can be interrupted or have other supply arrangements.

(b) Single sectionalized bus bar scheme

![Diagram of Single Sectionalized Bus Bar Scheme]

Fig:3.2: Single sectionalized bus bar scheme

In this scheme the main bus is divided into two or more sections with a circuit breaker and isolators in between the adjoining sections.

(c) Double bus bar single breaker scheme

This scheme facilitates the use of two identical bus bar so that :-

i) Each load may be fed from either bus bar.

ii) The power lines and load circuits may be divided into separate groups if needed for operational Considerations.
iii) Either bus bar may be taken out for maintenance and cleaning of the insulator.

In such a scheme a bus coupler breaker is mostly provided as it enables “on load” change over from one bus to another. The arrangement does not permit breaker maintenance without causing stoppage of supply.

![Fig:3.3: Double bus bar single breaker scheme](image)

(d) **Double bus bar double breaker scheme**

This scheme is seldom used expect in very large generating stations where security and continuity of supply is of paramount importance. Advantages of this scheme are each circuit has two dedicated breakers and any breaker can be taken out of service for maintenance. Also the scheme has flexibility in permitting feeder circuits to be connected to either bus and is highly reliable.
(e) **Breaker and half scheme**

Breaker and a half scheme is an improvement of the double breaker schemes to affect the savings in the number of circuit breakers. For every two circuits only the spare breaker is used. The protection is complicated since it must associated the central breaker with the feeders own feeder breaker taken out for maintenance. This scheme does not have much popularity because of the high cost of equipment.
(f) **Mesh scheme**

This scheme is also known as the ring scheme. This scheme has the following advantages

1. It provides double feed to each circuit. Opening one breaker under maintenance does not affect the supply to any circuit
2. It permits breaker maintenance
3. All sections of the conductors in the station are covered by feeder protection and no separate bus protection is necessary
4. Less costly than double bus or main and transfer bus scheme.

![Mesh Scheme Diagram](image)

Fig:3.5: Mesh scheme

(g) **Main and transfer bus scheme**

The main and transfer bus scheme adds a transfer bus to the bus scheme. An extra bus-tie circuit breaker is provided to tie the main and transfer buses together.
Fig:3.6: Main and transfer bus scheme

This scheme has disadvantages that this scheme requires one breaker for the bus tie. Again switching is somewhat complicated when maintaining a breaker and failure of bus or any circuit breaker results in shutdown of entire substation.

Assignment of Bus Bar Classification
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