**Lesson 41**

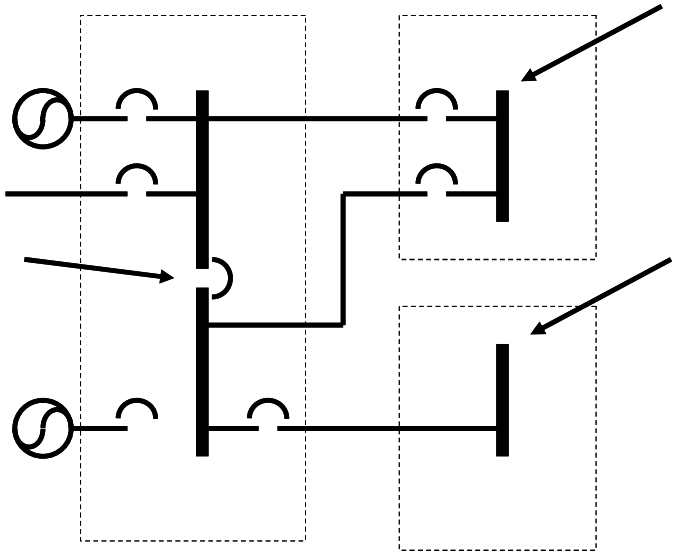
# YP Shipboard Power Distribution

*Lesson 41 Handout* Name:_____ Section: _____

I. Lesson Objectives:

A. Draw and explain the simplified diagram of the YP $450V_{AC}/120V_{AC}$ distribution system.
B. Explain the ratings of a Ships Service Diesel Generator (SSDG) onboard a YP.
C. Define a bus, breaker, split-plant operation, parallel plant operation and describe how these allow a distribution network to be designed for reliability and redundancy.
D. Describe the concept of vital and Non-vital loads, and list some for the YP.
E. Describe the Purpose of Transformers in an Electrical Distribution network.
F. Explain the purpose of shore power and how it is connected.
G. Describe the requirements for paralleling two power supplies.
H. Describe why Naval Ships use an ungrounded system.

II. **YP Power Distribution Diagram (**label and memorize**)**



III. **Ships Service Diesel Generator (SSDG)**

A. Rated output voltage $V_L$ = _____

B. Rated output apparent power ($S_T$) $S_T$ = _____

C. Determine real rated output power ($P_T$) if $F_P$ = 0.8 lagging

$P_T$ = _____

D. What is the corresponding line current

$I_L$ = _____

E. If the Diesel operates at 1800rpm, how many poles does the machine have?

P = _____

IV. **Power Distribution Equipment/Design:**

A. Define **Bus**:

B. What is the purpose of a **Supply Breaker**:

C. What is the purpose of a **Bus-tie Breaker**:

D. What is the purpose of a **Component Breaker**:

E. Explain **Split-Plant** operation:

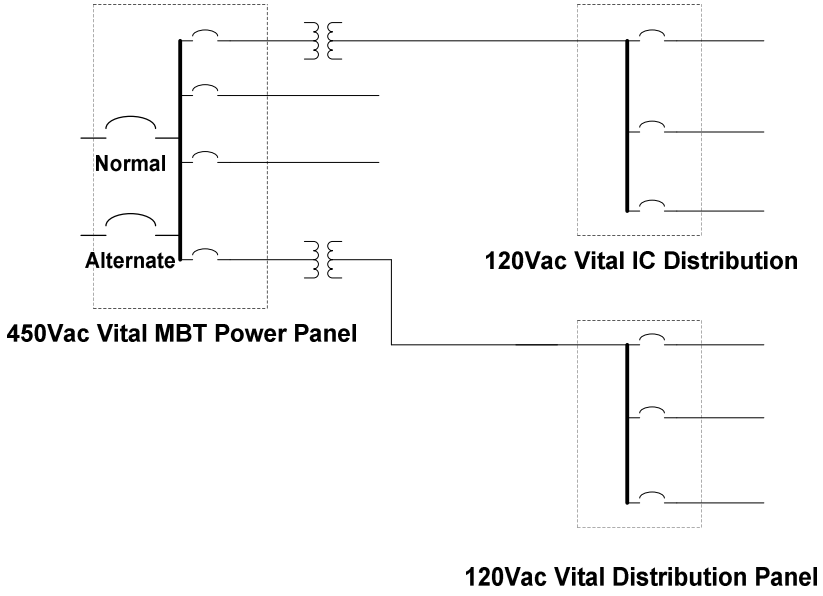
F. Explain **Parallel Plant** operation:

G. What is **Reliability**, and how do we design our Shipboard Power distribution network for it:

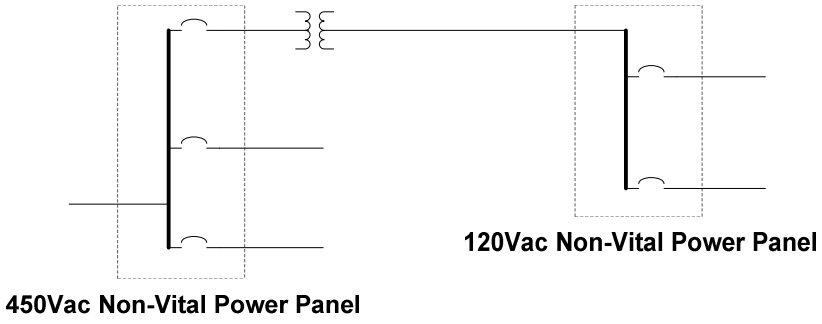
H. What is **Redundancy**, and how do we design our Shipboard Power distribution network for it:

## V. YP Power Distribution

A. Vital Loads: List major components powered by $450V_{AC}$ vital power panels (listed on figure 1 of supplement).




B. Non-Vital Loads**:** List major components powered by $450V_{AC}$ non-vital power panel (listed on figure 1 of Supplement).




## VI. Transformers:

A. What is the purpose of the shipboard transformers:

B. Describe the ratings of YP's primary transformers:

**VII. Shore Power:**

A. State two reasons why it is desirable to connect to a shore side power source:

1)

2)

B. Describe the differences between how a YP and a typical Warship connects to shore power:

C. Explain the purpose of shore power and how it is connected.

**VIII. Paralleling Requirements:**

**A.** What are the consequences of not paralleling two power supplies correctly:

**B.** What are the requirements for paralleling two supplies:

**1)**

**2)**

**3)**

**4)**

**IX. Grounded Vs. Ungrounded:**

A. Describe why Navy ships use an ungrounded system: