#478.

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION,

HARVARD UNIVERSITY.

November 8, 1916.

INDUSTRIAL ORGANIZATION.

POWER PLANTS.

#478.

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INTRODUCTION.

SUBJECT:
POWER PLANTS IN INDUSTRIAL BUILDINGS.

TYPES OF INDUSTRIAL BUILDINGS.

TYPES OF POWER PLANTS.

BUILDING EQUIPMENT REQUIRING POWER & STEAM.
- Tools & Machines.
- Elevators.
- Fans.
- Air Compressors.
- Heating.
- Lighting.
- Refrigeration.
- Process Steam.
- Hot Water.
- Kitchen Apparatus.
- Laundry Apparatus.

POWER PLANTS.

IMPORTANT FUNDAMENTAL FACTS:
- Power Plant Variations.
  - General Design.
  - Magnitude.
  - Importance.
- Equipment Variations.
  - Boilers.
  - Engines.
  - Generators.
  - Other Machinery.
- Inter-Relation of the Actual Power Problem with those of Heating, Lighting, Process Steam, Etc.

SOURCES OF POWER & TYPES OF PLANTS:
- Steam Boilers.
- Steam Engines.
- Water Power.
- Gas Engines.
  - Gasolene.
  - Natural Gas.
  - Illuminating Gas.
  - Producer Gas.
- Electric Generators.
- Public Power Service.
  - Steam.
  - Electricity.
  - Gas.
- Influence upon Building Site.
  - Water Power.
  - Condensing Water.
  - Delivery of Coal by Water.
- Influence upon Exact Location and Design of Building.
- Engine Plants vs. Public Service Power.
- Necessity for Steam for Heating & Process.
- Chimneys.
- Forced Draft Apparatus.
- Boiler Room Accessories.
  - Stokers.
  - Feed Water Heaters.
  - Feed Pumps
  - Receivers.
  - Inspirators.
  - Economizers.
  - Superheaters.
  - Blow-Off Tanks.

SOURCES OF POWER & TYPES OF PLANTS: Con'd.
- Engine Room Accessories.
  - Condenser Pumps.
  - Separators.
  - Air Compressors.
- Coal.
  - Handling Apparatus.
  - Storage.
  - Ash Handling Apparatus.
- Refrigeration Apparatus.

GENERAL PRINCIPLES OF STEAM POWER:
- Importance.
- Generation of Steam in Boilers.
  - Losses.
- Use of Steam in Engines.
  - Reciprocating Engines.
  - Simple, Compound & Condensing Engines.
  - Turbine Engines.
  - Losses.
  - The Ideal Engine.
  - Diagram
  - Economic Importance of Using Exhaust Steam.

GAS ENGINES:
- Efficiency.
- Cost.
- Increasing Use.

TRANSMISSION OF POWER:
- Belt & Rope Drives.
- Shafting & Belting.
- Belted & Direct-Connected Generators.
- Motors.
- Group Drive.
- Individual Drive.
- Transmission from Central Power House to Groups of Buildings.
  - Steam.
  - Electricity - Alternating Current vs. Direct Current.

CONSIDERATIONS IN SELECTING TYPE OF PLANT:

Requirements & Loads.
Power.
Light.
Heat.
Process Steam.
Refrigeration.
Yearly Loads.
Peak Loads.
Difficulty & Importance of Accuracy of Determination.
Influence upon Site.
Engines vs. Public Power Service.
Types of Boilers, Engines, Generators.
Method of Power Transmission.
Study of Cost of Installation & of Operation.
Interest, Depreciation & Maintenance.
Taxes & Insurance.
Labor & Repairs.
Fuel, Water, Oil & Waste, Etc.

IMPORTANCE OF SIMULTANEOUS CONSIDERATION OF ENGINEERING AND BUSINESS PROBLEMS:

EXAMPLES OF DIFFERENT TYPES OF PLANTS AND THEIR REQUIREMENTS:

· GRADUATE SCHOOL OF BUSINESS ADMINISTRATION ·
· INDUSTRIAL ORGANIZATION · · THE POWER PLANT ·
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· STEAM BOILER & ENGINE EFFICIENCIES ·