INTRODUCTION TO
ELECTRICAL
ENGINEERING IN THE
CONSTRUCTION
FIELD

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TYPICAL BUILDING CONSTRUCTION PROJECTS

BASE BUILDING
• BRAND NEW BUILDING, OUT OF THE GROUND

INFRASTRUCTURE UPGRADE
• INFRASTRUCTURE UPGRADE TO EXISTING BUILDING FOR NEW TENANT OR OWNER USE

FIT-OUT (INTERIORS)
• DESIGN OR REDESIGN OF EXISTING SPACE IN AN EXISTING BUILDING FOR A NEW TENANT, OR A TENANT WANTING TO REDESIGN THEIR OFFICE LAYOUT

DATA CENTER (MISSION CRITICAL)
• DESIGN OF POWER SYSTEMS FOR SERVERS/IT RACKS/HVAC

BACK-UP POWER
• PROVIDING BACK-UP POWER FOR A BUILDING OR TENANT, SUCH AS A GENERATOR OR UPS (UNINTERRUPTABLE POWER SUPPLY), TO PROTECT IN THE CASE OF A POWER OUTAGE

DUE DILIGENCE
• CONDITIONS ASSESSMENT ON EXISTING BUILDINGS
BASE BUILDING PROJECT EXAMPLES
FIT-OUT PROJECT EXAMPLES
DATA CENTER PROJECT EXAMPLE
BACK-UP POWER PROJECT EXAMPLES
DUE DILLIGENCE EXAMPLES
TYPICAL EE JOBS IN CONSTRUCTION

**DESIGN ENGINEERING***
- Designing the buildings/spaces/systems

**CONSTRUCTION MANAGEMENT**
- Work for a construction firm managing construction sites, coordinating with manufacturers, making sure contractors are building properly and maintaining the schedule, etc.

**OWNER’S REPRESENTATIVE**
- Manage all aspects of the project for the owner, making sure all team members are doing their jobs (engineers, architects, construction manager, etc.)

**COMMISSIONING AGENT**
- Testing of all equipment and systems upon completion of construction

**INVESTIGATION/FORENSICS ENGINEERING**
- Investigating existing buildings after a failure to determine fault, reason for failure, corrective measures, as well as litigation expert witnessing.
TYPICAL MEMBERS IN A “BASE BUILDING” DESIGN PROJECT

OWNER
• FUNDING THE PROJECT
• DETERMINATION OF USE OF BUILDING
• HIRE THE ARCHITECT AND SOMETIMES THE MEP ENGINEER

ARCHITECT
• PROJECT MANAGE ALL THE CONSULTANTS TO MAKE SURE EVERYONE IS COORDINATED
• BUILDING SHAPE
  • WALLS, DOORS, ROOMS
• ASTHETICS
  • COLORS, PAINTS, WINDOWS, CARPETS, ETC.
TYPICAL MEMBERS IN A “BASE BUILDING” DESIGN PROJECT

**MEP ENGINEERS**
- MECHANICAL (HVAC)
- ELECTRICAL (POWER, LIGHTING, AND FIRE ALARM)
- PLUMBING AND FIRE PROTECTION

**SUB-CONSULTANTS**
- LIGHTING DESIGNERS
- IT ENGINEERS
- ACOUSTICAL ENGINEERS
- LAB CONSULTANTS
- CIVIL ENGINEERS
- ETC.
ELECTRICAL SCOPE OF WORK:
TOTAL POWER REQUIRED

• CALCULATIONS AND DETERMINATION OF QUANTITY OF POWER REQUIRED FOR BUILDING/SPACE
• BASED ON OWNER DECISIONS/REQUIREMENTS
• BASED ON INFORMATION GATHERED FROM OTHER CONSULTANTS
• BASED ON SIZE AND WATTS/SF OF THE SPACE
• BASED ON WHAT UTILITY COMPANY WANTS TO GIVE US
• ETC.
ELECTRICAL SCOPE OF WORK:
INCOMING SERVICE

• LOCATION/SIZE
• INCOMING/OUTGOING VOLTAGE
ELECTRICAL SCOPE OF WORK:
MAIN DISTRIBUTION

• BUSDUCT VS. CABLE IN CONDUIT
• VOLTAGE DROP CALCULATIONS
• LOCATIONS OF MAJOR EQUIPMENT
• “RISER DIAGRAM”
ELECTRICAL SCOPE OF WORK:
MAIN SWITCHGEAR

• LAYING OUT SWITCHGEAR BASED ON REQUIREMENTS
ELECTRICAL SCOPE OF WORK:
LOCAL DISTRIBUTION

- POWER IN CABLE/CONDUIT TO EQUIPMENT FROM LOCAL PANELS BASED ON LOAD/VOLTAGE
- DISTRIBUTION TO RECEPTACLES, LIGHTS, HVAC EQUIPMENT, PFP EQUIPMENT, CONSULTANT EQUIPMENT, ARCHITECT EQUIPMENT, ETC.
ELECTRICAL SCOPE OF WORK:

LIGHTING

• LIGHTING DESIGNER LAYS OUT FIXTURES (QUANTITY, TYPE, WATTAGE, ETC.)
• THEY COORDINATE WITH ARCHITECT FOR LOCATION, TYPE OF CEILING, HOW MOUNTED, ETC.
• WE CIRCUIT LIGHTS
ELECTRICAL SCOPE OF WORK:

POWER

• ARCHITECT LAYS OUT RECEPTACLES
• HVAC, PFP, & OTHER TRADES LAY OUT THEIR EQUIPMENT/DEVICES
• WE CIRCUIT THEM
ELECTRICAL SCOPE OF WORK: GROUNDING

- DESIGN GROUND SYSTEM TO ENSURE ALL EQUIPMENT IS GROUNDED AT THE SAME POTENTIAL
- DESIGN PER CODE GUIDELINES
ELECTRICAL SCOPE OF WORK: LIGHTNING PROTECTION

- Faraday Cage System
- Mast System
- Owner Requested
ELECTRICAL SCOPE OF WORK:
COORDINATION WITH OTHER TRADES

• ARCHITECT
• HVAC
• PFP
• IT
• LIGHTING DESIGNER
• ACOUSTIC ENGINEER
• KITCHEN CONSULTANT
• STRUCTURAL ENGINEER
• ETC.
ELECTRICAL SCOPE OF WORK:
FIRE ALARM

• BASED ON OCCUPANCY OF BUILDING
• CODE GUIDELINES
WHY GO INTO THIS FIELD

• YOU GET TO WALK AROUND THE CITY AND POINT AT BUILDINGS YOU DESIGNED
• IT’S NOT A STALE JOB, YOU ARE DOING SOMETHING DIFFERENT EVERY DAY
  • SURVEYING SITES
  • CAD WORK IN THE OFFICE
  • MEETINGS WITH OTHER CONSULTANTS/CLIENTS
  • FIELD OR FACTORY TESTING EQUIPMENT
  • EVERY PROJECT YOU WORK ON IS DIFFERENT
  • ETC.
CONCLUSION

SIGN UP FOR MY CLASS IN THE SPRING IF THIS FIELD INTERESTS YOU!

THERE IS A NEED FOR MORE ELECTRICAL ENGINEERS IN THE CONSTRUCTION FIELD