

Brief Notes on Electrical Services and Lighting Systems

1. Main Supply and Distinction

- load assessment:
 - locations and types of loads expected (voltage, frequency, phase)
 - load estimation based on floor area or consumer units
 - major load centres and electrical equipments (identify and focus on them)
 - allow for diversity or future expansion
- design of distribution substation (transformer Tx room)
 - electricity supply provided by establishing a substation at the building or by direct cables from existing low voltage network
 - location of transformer room(s)
 - design requirements of HEC or CLP have to be satisfied

2. Low Voltage (L.V.) Distribution

- main consumer L.V. switchroom (usu. next to Tx room)
- L.V. distribution system:
 - for landlord services (e.g. A/C, pumps, lifts, escalators, public lighting)
 - for tenant services (domestic flats, shops & restaurant)
 - distribution methods of rising main:
 - by busbar risers or cables
 - distribution to end-users (final circuit):
 - via electrical wiring
 - metering arrangements
 - provision of distribution boards, circuiting, socket outlet, switches, protection devices (e.g. MCBs and RCBs)
 - earthing & bonding requirements (see Supply Rules)
- considerations for tenancy fitting-out works after occupation
- L.V. schematic diagram: shows locations of load centres and distribution methods

3. Essential (Emergency) Power Supply

- assessment of essential loads to be supplied to (e.g. fire services pumps, fireman's lift, emergency lighting)
- design of standby emergency generator
 - location, capacity required, operation
 - to comply with FSD's requirements (see FSD's COP)

4. Lighting System

- design criteria
 - lighting (illuminance) level in lux for each area of the building
 - selection of luminaries for different usage and applications
- simple lighting calculations (lumen method)

- lighting (switching) control and lighting circuiting
- emergency lighting (separate circuitry may be required)
- outdoor lighting (e.g. floodlighting and neon lights)
- coordination with architectural and interior design

5. Other Minor Systems

- lightning protection system
- telephone services
- TV aerial services
- CCTV, PABX, CABD

6. Design Considerations

- relationships with and implications from other Building Services systems
 - electrical design always come after others because it has to obtain ratings and demand of equipment from other services systems
 - coordination of electrical services with other trades and with architectural design
- space requirements: (estimate space required and make adjustments later on)
 - for Tx room and emergency generator
 - for rising main, meter room
 - for distribution boards (in cupboards, in corridor or on walls)
- accessibility of equipment (e.g. access tom Tx room by HEC/CLP personnel)
- estimated costs for electrical services systems and other B.S. systems

Useful References:

For electrical supply and distribution system

- Chan, S. F., 2003. *A Practical Guide to Electrical Installation*, Wan Li Book Co., Ltd., Hong Kong. (in Chinese)
- EMSD, 2003. *Code of Practice for the Electricity (Wiring) Regulations*, Electrical & Mechanical Services Department (EMSD), 2003 Edition, the Government of the Hong Kong Special Administrative Region, Hong Kong.
- Electrical Ordinance (Cap. 406) and its related regulations.
- Supply Rules (from HEC or CLP)
- Guide to Connection of Supply (from HEC)
- Code of Practice 101- Distribution Substation Design (from CLP)
- IEE Wiring Regulations for Electrical Installations 16th Edition
- FSD's Code of Practice for Minimum Fire Services Installation and Equipment

For lighting system:

- CIBSE, 2004. *Code for Lighting* [CD-ROM], Chartered Institution of Building Services Engineers, London. [AV 621.320218 C66]
- IESNA, 2000. *The IESNA Lighting Handbook: Reference & Application* [CD-ROM or printed], 9th ed., Illuminating Engineering Society of North America, New York. [621.32 I22]
- Smith, N. A., 2000. *Lighting for Health and Safety* [eBook], Butterworth-Heinemann, Oxford and Boston. [Knovel 621.32 S65]