AS Unit 1: Our Built Environment

2.1.8: SERVICES (2 of 2)

COMMERCIAL BUILDINGS (cont.)

Escalators

These are used in buildings where the movement of a large number of people is required, such as shopping centres and airports. They have similar space requirements as stairs but allow a greater flow of people. They operate at around 0.3-0.6m per second and are driven by an electric motor and chain system. The motors are located at the top of the escalator and also power the moving handrail.

Electrical and communication services

A modern commercial building is likely to include a computer-based 'building management system' (BMS), which will monitor and control a range of electrical services, including:

- power distribution and energy consumption
- lighting and shading devices
- heating, ventilation, and air conditioning
- fire detection and alarms
- security sensors, CCTV, and access control
- internet connectivity, ICT systems and UPS
- lifts.

A BMS will allow for close control of services and internal conditions, help reduce operating costs and carbon emissions, and may be integrated with BIM data to allow performance in use to be compared with performance criteria specified at this design stage.

Gas supplies

Used for boiler based heating systems and in commercial kitchens, these gas installations should be covered by gas safety certificates as confirmation that the appliances, pipe work and flues have been installed and maintained in a safe condition, so as to prevent risk or injury to any person. The control of the heating system would be integrated with the BMS.

Water supply

Water supplies will be used for drinking, cooking, cleaning and sanitation, and possibly firefighting. The water system must resist corrosion, not leak, and supply water of a suitable quality that is free of bacteria such as legionella.

For firefighting in high-rise buildings, the water system may include wet risers, maintained under pressure, or dry risers for external connection to a water source by fire fighters. A sprinkler system, with independent storage tank and pumps, may also be provided for fire protection.

REQUIREMENTS FOR INDUSTRIAL BUILDINGS

Three-phase 400v supplies

The availability of a high voltage power supply may be fundamental when making decisions regarding the siting of an industrial building. Industrial processes are often energy intensive, and the cost of installing suitable supplies and switchgear will be significant. A typical industrial installation may include an on-site substation with switchgear and busbar trunking distributing 3 phase power to tap off points throughout the production space, each connected to an isolator, cabled to electric motors and other machinery.

Three-phase power (three wires delivering three independent alternating currents) is often preferred because a three-phase machine receives a more stable flow of electricity than a single-phase distribution system, making it more efficient, and reliable.

Industrial buildings increasingly supplement their energy usage with on-site renewable sources of electricity such as wind turbines.

Gas supplies to boilers

Boilers used to provide hot water to kitchens and welfare areas as well as space heating for offices. Space heating in production areas is likely to involve ceiling level, gas-fired infra-red radiant tube heaters.

Water supply

See commercial buildings, including additional storage tanks for sprinkler systems. Water is also widely used in industrial processes. Very often this water must be treated before entering the process to ensure its quality and properties will meet the required specifications. In addition, discharge regulations and policies include requirements for recycling and reuse of wastewater.

REQUIREMENTS DURING CONSTRUCTION

Temporary supplies

Temporary water, power and communication services will be required for a construction site to function.

Water supplies to welfare facilities and for washing down and mixing; communication services, possibly land line telephones and internet connection; and mains electricity or generators and transformers to provide:

- three-phase 400 Volt supplies, for heavy plant, such as a tower crane
- single-phase, 230 Volts supplies for welfare facilities, battery charging and exterior floodlighting
- LV supplies, 110 V socket-outlets and site lighting.

Protection of existing services

The location of existing underground services must be established during the site investigation stage, and these must be marked, diverted, or protected during construction. Overhead power lines should also be noted and any work in their proximity, such as erection of scaffolding, undertaken only after suitable safety control measures have been put in place.