

TECHNOLOGY

SNAPSHOTS

Building Better Healthcare: The Vital Role of Clinical Engineering in Hospital Construction

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Hospital Construction: A Complex Endeavor

"If you want to look far ahead first look far back. And then be aware that you are designing for the present but also designing for the future which is unknown. (Norman Foster, Architect)"

- Importance of Construction
- Complexity of Hospital Construction
- Role of Various Stakeholders





Integrating Clinical Engineering in Hospital Construction

- Definition and Scope
- Key responsibilities
- Importance of Early Involvement
- Collaboration with Architects, Engineers and Design team
- Ensuring Compliance with Regulatory Standards and Guild lines











Role of Equipping in the Build Cycle

	0 Strategic Definition	1 Preparation and Brief	2 Concept Design	3 Spatial Coordination	4 Technical Design	5 Manufacturing & Construction	6 Contraction of the formation of the fo	7 In Use
Key Objectives	To gather and analyse data related to equipment requirements, identify strategic equipment considerations, and contribute to the development of the project's strategic goals.	To collaborate with the design team and client to develop a comprehensive understanding of equipment requirements and contribute to the project brief.	To contribute to the development of conceptual design proposals, ensuring that equipment considerations are incorporated into the design concepts.	To refine the equipment planning based on the developed design, ensuring that equipment specifications and requirements are accurately represented.	To collaborate closely with the design team and contractors to ensure that equipment- related details are fully coordinated and documented.	To oversee the installation, commissioning, and handover of equipment, ensuring that it meets the project requirements and is ready for operation.	To provide the client with all necessary information and support regarding the operation, maintenance, and future procurement of equipment	To effectively manage and maintain the equipment, ensuring its continued operation, performance, and user satisfaction throughout the building's lifecycle.
Key Tasks	 Equipment Needs Assessment Report Equipment strategy outline Equipment planning recommendation Budget Considerations 	 Equipment Inventory Equipment Needs Assessment Equipment Inventory Development Equipment Specifications Budget Considerations Sustainability and Energy Efficiency Stakeholder Consultations 	 Equipment Options and Recommendations Equipment layout suggestions Equipment Placement and Integration Equipment selection criteria Review Equipment Options Equipment Spatial Clearances Sustainability Considerations Preliminary equipment procurement plan Design Coordination 	 Develop comprehensive equipment specifications Equipment integration plans Equipment procurement strategy Updated equipment cost estimation Sustainability and Energy Efficiency Considerations Value Engineering and Optimisation Collaboration with Equipment Suppliers and Manufacturers 	 Equipment Coordination and Integration Equipment coordination drawings Equipment installation specifications Equipment commissioning plan Equipment procurement management Accessibility and Maintenance Considerations Collaboration with Specialists and Consultants 	 Equipment installation oversight Equipment commissioning coordination Equipment handover documentation Construction Documentation Quality Assurance Coordination with Other Building Systems Health and Safety Compliance 	 Equipment operation and maintenance manuals Equipment lifecycle planning Warranties and Guarantees Equipment training and familiarisation 	 Equipment Performance Monitoring Reports Post-occupancy evaluation Future Equipment procurement recommendations Equipment Replacement and Upgrade Plans Equipment User Feedback Compliance and Safety Management Energy Efficiency Optimisation



Scope and Equipment



Grouping of Equipment



Group 1 Equipment and fittings <u>built into the</u> <u>fabric of the building.</u>

Examples: Sinks, cabinetry, terminal outlets

Group 2 Equipment that requires <u>fixing to the</u> <u>fabric of the building.</u>

Examples: MRIs, equipment fixings, whiteboards, dispensers



Group 3 <u>Free standing equipment such as IT</u> equipment & medical devices.

Examples: Beds, trollies, bins, pumps, computers, telephones



Group 4 <u>Small items, such as consumables, with</u> <u>an impact</u> on space or engineering services.

Examples: Surgical, diagnostic instruments

Contractor (supplied and fixed)

Client (supplied) Contractor (fixed)

Supply and Fitting

Client (supplied and fixed)

Client (supplied)





Medical Equipment	Furniture and Furnishings	IT and Communication Systems	Safety and Security Equipment	Environmental and Facility Management Systems
Diagnostic equipment (e.g., MRI machines, X- ray, CT)	Hospital beds, bedside tables, and chairs	Communication devices (e.g., nurse call systems, intercoms)	Fire detection and suppression systems	Heating, ventilation, and air conditioning (HVAC) systems
Treatment equipment (e.g., surgical instruments, anesthesia machines)	Examination tables and treatment carts	Telemedicine equipment for remote consultations and diagnosis	Security cameras and access control systems	Lighting fixtures and controls
Patient monitoring systems (e.g., vital sign monitors, telemetry units)	Waiting room furniture and seating arrangements			Plumbing fixtures (e.g., sinks, faucets, toilets)
Rehabilitation equipment (e.g., mobility aids)	Office furniture for administrative and clinical staff	Networking infrastructure and IT hardware for data storage and transmission	Emergency response equipment (e.g., defibrillators, first aid kits)	Waste management systems







Operational Efficiency	Quality Assurance	Cost Efficiency	Flexibility and Adaptability	Sustainability
Integration of technology and automation streamlines workflows, reduces manual errors, and enhances productivity.	Needs assessments and standardised protocols help ensure that only high-quality and reliable equipment is acquired.	Standardisation of equipment selection and procurement processes can lead to bulk purchasing discounts and reduced administrative costs.	Regular monitoring and evaluation allow for ongoing adjustments to equipping strategies based on evolving needs, technological advancements, and changing regulatory requirements.	Consideration of sustainability criteria in equipment selection promotes energy efficiency, resource conservation, and environmental responsibility.
Interoperable systems facilitate seamless communication and data exchange between different departments, improving coordination and collaboration.	Compliance with regulatory standards and industry best practices is prioritised, reducing the risk of equipment failure or malfunctions.	Strategic planning ensures that resources are allocated effectively, minimising wastage and unnecessary spending.	The centralised approach ensures that the hospital remains agile and responsive to emerging challenges and opportunities in healthcare delivery.	Lifecycle management strategies prolong the useful life of equipment, reducing the frequency of replacements and minimising environmental impact





• Horizon scanning involves identifying and monitoring trends, innovations, and emerging technologies in healthcare. • By staying informed about advancements in medical equipment and technology, healthcare facilities can anticipate future needs and plan their equipping strategies accordingly. • This proactive approach enables hospitals to stay ahead of the curve and adopt cuttingedge technologies that enhance patient

care and improve

clinical outcomes.



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Plan

Strategic

• Future technology assessment allows healthcare facilities to assess the potential impact of emerging technologies on their operations and patient care delivery.

- By integrating insights from horizon scanning into strategic planning processes, hospitals can prioritise investments in equipment and
- infrastructure that align with future trends and healthcare needs.
- This ensures that equipping efforts are forward-thinking and adaptable to evolving healthcare landscapes, thereby

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innovative technologies and solutions that have the potential to revolutionise healthcare delivery. • By actively seeking out and evaluating emerging technologies, hospitals can make

informed decisions about adopting new equipment and implementing

- nnovation transformative initiatives.
 - This fosters a culture of innovation within healthcare facilities and enables them to harness the benefits of cutting-edge technologies to improve patient outcomes, enhance operational efficiency, and drive continuous improvement.



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Collaboration



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• Horizon scanning collaboration with industry partners, research institutions, developers to stay abreast of the latest • By forging strategic partnerships with technology vendors

and other stakeholders, healthcare facilities can access expertise, resources, and opportunities for coinnovation.

• This collaborative approach facilitates the seamless

integration of future technologies into equipping strategies









Examples and Case studies

- Integration of Advanced Imaging Equipment in a Radiology Department
- Implementation of Telehealth Technology for Remote Patient Monitoring
- Surgical Suites with Robotic Surgery Systems
- Building a Hybrid Operating Room for Minimally Invasive Procedures
- Implementing Smart Hospital Technologies for Patient-Centered Care
- Designing Sustainable Healthcare Facilities with Energy-Efficient Systems
- Implementation of Automated Medication Dispensing Systems
- Implementation of Silent Hospital Solution



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Integration of Advanced Imaging Equipment in a Radiology Department

- Equipment Selection and Procurement
- Infrastructure Planning and Site Preparation
- Integration with Existing Systems
- Installation and Commissioning
- Staff Training and Education
- Quality Assurance and Compliance
- Technical Support and Service
- Continuous Improvement and Optimisation







Silent Hospital Solution

- Evaluation and Selection of Noise Reduction Technologies
- Integration with Medical Equipment
- Staff Training and Support
- Data Monitoring and Analysis







Thank you!

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