

7.2.1 Job Dashboards

Civil and Structural Engineer

Megatrends impacting the Job Role in Short to Medium-Term

COVID-19	Multi-Skilling	Sustainable Construction/ Buildings	Value Chain Aggregation & Integration	Workforce Challenges
----------	----------------	-------------------------------------	---------------------------------------	----------------------

Impact Assessment

M

MEDIUM

degree of change in tasks

Technology Trends impacting the Job Role in Short to Medium-Term			
BIM Technology	Data Analytics & AI	Digital Twin	Remote Monitoring
VR/AR	5G, IoT & Smart Buildings	Modular Construction	

Today

This job role is responsible for managing the planning and development of projects, developing concepts to schematic and detailed designs based on requirements; and conducting project assessments and provides feasible and creative solutions. Job holders participate in the tendering processes and monitors contractors and subcontractors. Job holders also plan the manpower allocation and provide on-the-job coaching to junior staff.

In the Future

This job role may leverage technology in management of project planning and development, **enhancing the robustness of solutions proposed through adopting data-driven approaches in addressing feasibility concerns and project risks**. Job holders may need an understanding of technology to **apply in facilitating the tendering process and monitoring work progress**, and awareness of trends and technologies so as to **incorporate the use of environmental sustainability and green building methods into designs**. Job holders may see continued focus on people management in response to evolving trends and technologies.

Job Tasks Today	Impact at Task-level / Future view of Job Tasks		Time Horizon
Define project scope and requirements	M	<ul style="list-style-type: none">Job holders will continue to conduct feasibility studies and compile associated project risks, and may see technology (e.g., Data Analytics & AI) enhancing the generation of feasibility study outcomes to be more efficient and accurate.Job holders may also need data interpretation skills to interpret and evaluate data insights from feasibility studies to propose robust, data-driven solutions to relevant stakeholders.	Short-term
Conduct design development	M	<ul style="list-style-type: none">Job holders will continue to develop engineering designs, and may be expected to leverage technology to augment the design process to be more efficient and effective (e.g. Data Analytics and RPA can automate calculations, programming of analysis models to reduce design conflicts).Job holders will also need ensure that designs incorporate the use of relevant methods (e.g., Green Buildings, DfM, DfMA). Job holders may also need to keep abreast of new engineering methods to meet future structural needs (e.g., Coastal Engineering, Sustainable Engineering).Job holders may need capabilities to amend engineering analysis models in consideration of the impact of trends on design specifications, ensuring avoidance of design and engineering conflicts.	Short-term

7.2.1 Job Dashboards

Civil and Structural Engineer

Job Tasks Today	Impact at Task-level / Future view of Job Tasks		Time Horizon
Conduct design development (cont'd)	L	Job holders will also continue to develop legislative submissions across all project stages.	Short-term
Perform tendering processes	L	Job holders may need an understanding of smart contracting technology (e.g., Blockchain) to prepare tender and contractual terms on alternative platforms and conduct pre-qualification and assessments for tender selection.	Long-term
	M	Data Analytics & Artificial Intelligence may augment quantitative estimation for project costs and resources and help job holders develop more accurate estimates in a shorter duration. Job holders will need to possess data interpretation skills to validate the estimates with technical experts.	Short-term
	L	As-built designs may be automated and consolidated in digital platforms through the use of digital tools (e.g., RPA). Job holders will still need to validate the design output, and understand how to utilise the technology to apply changes to the as-built designs , as required.	Medium-term
Monitor project execution	M	Job holders may also need an understanding of real-time data captured of the construction process and how to interpret it efficiently , so as to monitor execution and liaise effectively with contractors to resolve the necessary defects.	Short-term
Manage people and organisational functions	M	<ul style="list-style-type: none"> Job holders may see increased emphasis on on-the-job coaching to support the adoption of digital tools and platforms. Job holders may need an understanding and application of collaborative tools and platforms (e.g., BIM Technology) to coordinate work activities plans and manpower allocation, and track work progress. 	Short-term

7.2.1 Job Dashboards

Civil and Structural Engineer

The following TSCs/CCSs have been identified as in-demand/emerging for the job role going forward:

In-demand Technical Skills and Competencies		
Building Information Modelling Application	Computational Design	Construction Technology
Critical Thinking	Data Collection and Analysis	Design for Maintainability
Design for Manufacturing and Assembly	Green Building Strategy Implementation	Integrated Digital Delivery Application
People Management	Project Risk Management	Regulatory Submission and Clearance
Stakeholder Management	Technology Application	
Emerging Technical Skills and Competencies		
Analytics and Computational Modelling	Biophilic Design in Built Environment	Coastal Engineering
Environmental Sustainability Management	Hydrodynamic and Flood Mitigation	Programming and Coding
Sustainable Engineering	Tunnel Engineering Management	
Emerging Critical Core Skills		
Transdisciplinary Thinking		