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<sup>Prepared:</sup> Sai Kanuparthi	Checked: ELDS Engineering Council	Approved: Lorenzo Bonzi	Replaced	Valid for: ELDS	

## **ABB** internal

# **Distribution Solutions (ELDS)**

# Project and Requisition Engineering Assessment Instruction

#### **Revision History**

Rev A 31st July 2018

All sections. 1st Issue of the document after the review by ELDS Engineering Council and FCA Assessor team.

#### Rev. B 16th March 2022

All sections are updated.

New Assessment Areas are introduced to meet the revised Job Descriptions introduced under Job Family Group Engineering.

All links are verified and updated

#### Rev. C February 2024

All sections are updated.

New Assessment Areas are introduced to meet the revised Job Descriptions introduced under Job Family Group Engineering.

All links are verified and updated



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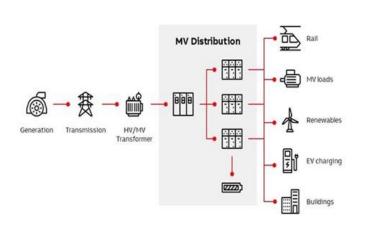
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## 1 Motivation for Engineering Skills and Competencies Assessment

The core technologies of Distribution Solutions include Breaking and Protection. The project and requisition engineering teams in Distribution Solutions provides the solutions/application expertise for these technologies to meet our customer's business needs and expectations related to distribution of power/energy.

This Assessment Instruction has been developed in alignment with ABB Skills Framework to ensure a uniform understanding of the skills and competency requirements for each engineering job within Job Family Project Engineering. Each engineer in our division is empowered to take ownership of their career, learning & development to meet the needs and expectations of customers' and market. This will "Enhance Customer Experience; and Deliver Value and Delight" as we design and implement "Safe, Smart and Sustainable Energy Distribution Solutions" to our customers.





## 2 Engineering Job Roles covered for the Skills and Competencies Assessment

Depending on the business needs and requirements the number job roles within our Local Units will vary. We identify the following engineering job roles for the Skills and Competencies Assessment:

- 1. Associate Designer
- 2. Designer
- 3. Senior Designer
- 4. Principal Designer
- 5. Associate Project Engineer
- 6. Project Engineer
- 7. Senior Project Engineer
- 8. Principal Project Engineer
- 9. Project Lead Engineer
- 10. Senior Project Lead Engineer



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## 3 Skills and Competencies Assessment

#### 3.1 Skills and Competencies

ABB Skills Framework will ensure a uniform understanding of the skills and competency requirements for each engineering job across ABB. One of the key activities as part of Skills and Competencies Assessment is creation of Development Plan by applying ABB's Learning Philosophy.

Functional Competency	Description
Engineering Technical Expertise	People demonstrating this competency apply their depth of knowledge, judgement & expertise to achieve/implement effective (efficient and high quality) and safe results/solutions. They keep their expertise up to date.
Engineering Solutions	People demonstrating this competency understand customer infrastructure and needs. They identify, improve, and deliver engineering solutions that meet business needs and add value to customer.
Engineering Processes and Tools	People demonstrating this competency apply and improve engineering and administrative processes, tools in a systematic and structured way, align these to external standards and manage documentation so that optimal results are achieved with defined contents, deadlines, and budget.
Engineering Risks and Opportunities	People demonstrating this competency assess risks to identify consequences with accuracy and by using knowledge of risk management, they propose means with proper analyses of cost and other associated impacts to the project/organization and execute means to mitigate risks. They capture opportunities and act on them.
Technical Information Sharing	People demonstrating this competency achieve efficient transfer of know-how by sharing their knowledge with colleagues/ stakeholders. They ensure clear, efficient, and timely exchange of information to ensure good results. They build and maintain constructive networks, and convince stakeholders to take desirable action by using relevant arguments
Planning & Prioritizing	Creates and adjusts plans in line with strategic goals and priorities coordinating with interrelated functions to increase efficiency.
Consulting & Facilitating	Enriches the operation of other organizations using own expertise. Establishes partnering relationships and builds mutual commitment. Facilitates the consultation process to achieve good results.



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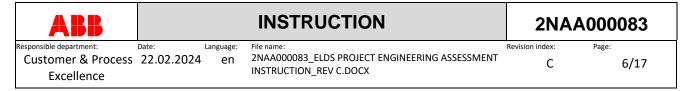
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#### 3.2 **Assessment Areas**

The assessment areas reflect the competencies, skills and knowledge required for project and requisition engineers in Distribution Solutions. This will provide our engineering community capability development (which will drive quality, efficiency, and consistency in customer experience) as well as a career path (which drives engagement, and as a result performance and customer experience).

In total 27 learning/assessment areas are defined (see table below) which reflect the competence areas of our primary business in Distribution Solutions. The equivalent learning areas are documented in 2NAA000082 ELDS Project and Requisition Engineering Learning Catalogue

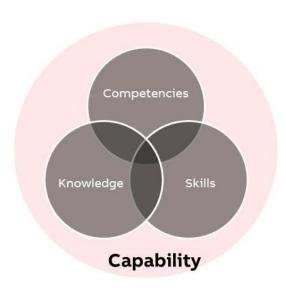
	Associate Designers Designers Sr. Designers Associate Project Engineers	Principal Designers Project Engineers Project Lead Engineers	Sr. Project Engineers Principal Project Engineers Sr. Project Lead Engineers
Application of Breaking and Protection technologies	Distribution Solutions overview     Switchgear components, and functions     Switchgear functional engineering and design     Packaging Solutions I	Digital Switchgear Digital Solutions Design and Implementation I Direct Current (DC) Systems Packaging Solutions II	Cyber-Security for Operational Technology (OT)     Digital Solutions Design and Implementation II     Power Systems Studies     Segment-specific Energy Distribution Solutions
Processes and Tools to enhance customer experience	Engineering Design Tools and Applications	Safety in Design     Design Thinking     Data Driven Insights	Design Verification     Agile / Lean Methodologies     Design for Excellence
Collaboration with Project Manager and Project Execution team	Planning and Prioritizing     Engineering Change Management	Engineering Risks and Opportunities	
Soft skills/Leadership skills	Technical Information Sharing	Influencing without authority	Coaching     Facilitating and problem solving     Consulting



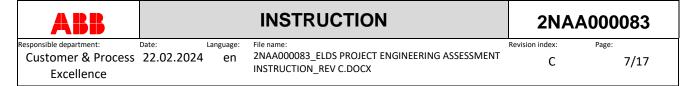
#### 3.3 Process

The Skills and Competencies Assessment ensures that all have same understanding of the requirements for each job.





Competencies Knowledge and Behavior that lead to success in a job		Skills Learned and applied abilities needed to perform a job well		Knowledge Information, Tools, Techniques, and Methods that are learned	
Programming  Decision Making  Strategic Planning  Networking		<u>a</u> ×	Programming Language Using a tool / machinery Using EPLAN Electric P8	<b>∳</b> <b>≜</b> ₩	Business Opportunities and Challenges Statutory regulations Process Methodology

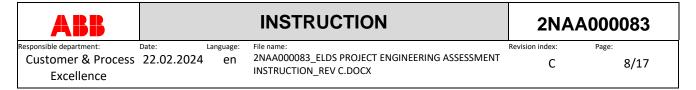


#### 3.4 Developing Engineering Skills and Competencies

Enhancing the application engineering capability, and domain knowledge of the customer industry/segment we are serving is one of the key areas identified as part of the Development Plan for engineers.

ABB's Learning philosophy follows 70:20:10 principle for developing skills and competencies.

Learning category	Typical activities with examples
On-the-job (70%)	Experiential learning (learn from work experience) Business related reflection
	<ul> <li>Study Customer's Contract and discuss with Project Manager and team what Standards and Statutory requirements, solutions(s) are applicable to meet the contractual obligations.</li> <li>Identify the top risks repeated from the last 3 projects related to project scope.</li> <li>Complete Design Verification according to IEC/ANSI Standards.</li> <li>Participate in a Design Verification according to IEC/ANSI standards as part of Project Peer Review</li> <li>Actively utilize Engineering Configurator, EPLAN Electric P8 / SolidWorks or other applicable tools for Switchgear configuration, electrical / mechanical design.</li> <li>Validate the BOM before uploading to SAP.</li> <li>Study a report related to "Power Systems Studies", and understand how it impacts the design of Electrical Distribution System e.g., Relay Settings</li> <li>Volunteer to participate in "Power Systems Studies".</li> </ul>
Along-the-job (20%)	<ul> <li>Self-reflection</li> <li>Coaching, mentoring</li> <li>Examples: <ul> <li>Develop 3 actions for personal learning from lessons learned on past 3 projects.</li> <li>Identify the areas where you need coaching or mentoring along with your Line Manager.</li> </ul> </li> </ul>
Off-the-job (10%)	Formal training Self-study Reading  2NAA000082 ELDS Project and Requisition Engineering Learning Catalogue has off-the-job development opportunities.



#### 3.5 Assessor Selection and Training

Each Business Line will appoint 2 to 8 assessors to come to an objective and uniform assessment for each of the Engineering Skills and Competencies.

The designated assessors in each Business Line:

- Undergo ABB's Behavioral Interview Training (BIT)
   Behavioral Interview Training E-Learning V3 9CSC001771-GLB-EN
   https://mylearning.abb.com/coursepage/17894/ExpertusONE 1/64650-37866834
- 2. Thoroughly understand the ABB's Engineering Competency Model and associated documents
  - a. Job Descriptions for Job Family "Project Engineering"
  - b. 2NAA000067 White Paper ELDS Project Engineering Rev C
  - c. 2NAA000082 ELDS Project Engineering Learning Catalogue Rev D
  - d. 2NAA000083 ELDS Project Engineering Competence Assessment Instruction Rev C (this document)
- 3. Thoroughly understand the Skills and Competency Assessment Process
- 4. Plan for assessment interviews

Position	Assessment Areas	Duration of the interviews
Associate Designers	1 to 8	60 Minutes (1 Hour)
Designers		
Senior Designers		
Associate Project Engineers		
Principal Designers	1 to 17	90 Minutes (1.5 Hours)
Project Engineers		
Project Lead Engineers		
Senior Project Engineers	1 to 27	120 Minutes (2 Hours)
Principal Project Engineers		
Senior Project Lead Engineers		

- 5. Apply BIT Techniques e.g., Funneling, STAR Technique during the Assessment. The assessor can utilize "Skills and Competency Assessment Questionnaire" mentioned in Section 3.6 of this document as a guidance.
- 6. Prepare for Assessment Feedback incl. Development Plan post Assessment.
- 7. Conduct Assessment De-brief meeting.



Funneling

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Funneling is one of the key behavioral interviewing techniques. Questioning in the interview should start with open questions followed by more detailed, probing questions. This pattern of examining competencies with a broad open question, then narrowing it down to a more specific point, is called "funneling". The funneling technique ensures that the interviewer moves from generic level down to the fact level until obtaining enough specific evidence of competency.

1. Open

2. Examples / actions

3. Probing



## STAR model

Situation & Task

Describe a situation/time when? Tell me about a time when?

What were the circumstances surrounding?

What was the most memorable time when that happened?

Describe your specific role in the project.

Action

Exactly what did you do? Describe specifically how you did

What did you do first, second?

Walk me through the steps you took.

How did you go about it? Why did you?

Demonstrate how you...

Result

What was the result / outcome?

How did it work out?

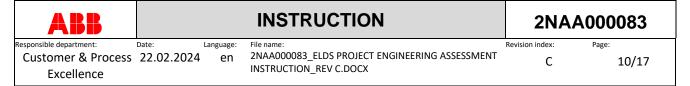
What problems / success resulted from this?

What feedback did you receive?

How do you know the customer was satisfied?

Were you able to reach Objectives / targets?

What did you learn from it?



#### 3.6 Skills and Competencies Assessment Questionnaire

The objective of this sample questionnaire is to come to an objective and uniform assessment for each of the Engineering Skills and Competencies. The designated assessors should apply these "Open Ended Questions" as a guidance during assessment interview and assess the concerned engineers.

#	Assessment Area	Assessment Questions	Applicability
1	Distribution Solutions Overview	<ul> <li>How do we describe your understanding of Distribution Solutions business?</li> <li>What Standards and Statutory requirements are applicable for designing Switchgears to meet the contractual obligations?</li> <li>How do you understand "Breaking and Protection" technologies. Please provide some examples.</li> </ul>	Associate Designer and above
2	Switchgear components, and functions	How do understand "Electrical/mechanical components selection & application, design and functions" related to Switchgear e.g.  • Mechanical Construction (e.g., Enclosure, modular compartments)  • Circuit Breakers  • Current Transformer (CT); Voltage Transformer (VT) and CT/VT Sensors  • Relay selection including Trip relays & Auxiliary relays  • Low Voltage Compartment (LVC)  • Power and Control cable connections  • Communication protocols and Communication media  • Contactors  • Cutouts; Switches and Disconnectors  • Vacuum Interrupters & Poles; Epoxy Components	Associate Designer and above
3	Switchgear Functional Engineering and Design	What factors influence the switchgear design?  How do we meet the project scope statement? How do you translate customer needs and expectations in Switchgear Design?  What functional requirements do you consider for designing Switchgears to meet the contractual obligations?  Please explain few complex protection schemes you have utilized while meeting the contractual obligations? (For electrical engineers)  Please explain few complex DTOs you have designed while meeting the contractual obligations? (For mechanical engineers)	Associate Designer and above



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#	Assessment Area	Assessment Questions	Applicability
4	Packaging Solutions I	How preconfigured, standardized, scalable and replicable solutions provide our customers with shorter times, a smoother startup, and less risk?  Please explain the projects you have designed with examples.	Associate Designer and above
5	Engineering Design Tools and Applications	<ul> <li>How do you describe your understanding of the following?</li> <li>Engineering Deliverables Overview and Engineering Data Flow</li> <li>Design To Order (DTO) process</li> <li>Engineer To Order (ETO) process</li> <li>Please describe the tools you apply in your current engineering function.</li> <li>How do you document and monitor engineering costs, scope, and time?</li> <li>How do you ensure engineering hours and costs are within budget?</li> <li>How do you validate the BOM before uploading to SAP?</li> </ul>	Associate Designer and above
6	Planning and Prioritizing	How do you ensure clear, efficient, and timely completion of deliverables to ensure good results? Please provide example.  How do you create, and adjust plans in line with project goals and priorities coordinating with interrelated functions to increase efficiency? Please provide example.  How do you prioritize tasks and projects according to their relative urgency and importance? Please provide example.	Associate Designer and above
7	Engineering Change Management	Describe the procedure you follow to achieve "Design Freeze" with Customers.  Describe the procedure that is followed for implementing and tracking "Engineering Changes" after Design Freeze.  Have you implemented "Peer Review Checking" of design documentation before submitting to customer? Please provide examples.	Associate Designer and above
8	Technical Information Sharing	How do you ensure clear, concise, and timely exchange of information with relevant stakeholders? Please provide examples.  How do you reflect your communication style – passive, aggressive or assertive?  What would be your plan of action to develop yourself with an assertive communication style?  How do you convince stakeholders to take desirable action by using relevant arguments? Please provide examples.	Associate Designer and above



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#	Assessment Area	Assessment Questions	Applicability
9	Digital Switchgear	How do you understand and document the functional requirements for designing Digital Switchgears to meet the contractual obligations, customers' needs and expectations? Please provide examples.  How do you configure and test Protection & Control applications e.g., MCC, PCC utilizing IED (Intelligent Electronic Devices) / Relion® series relay programming? Please provide examples.  How do you define the IEC 61850 and GOOSE communication protocol to meet the project scope? Please provide examples.	Project Engineer and above
10	Digital Solutions Design and Implementation I	How do you understand and document the functional requirements for designing "Digital solutions" to meet the contractual obligations, customers' needs and expectations? Please provide examples.  Please share an example of project where you have recently designed and implemented Digital solutions. What components have you utilized e.g., Zenon, ZEE600, ZEE600C, AC500 PLC, CP600, RIO600, SMU615, SSC600 and SSC600 SW	Project Engineer and above
		Have you participated in Integrated Test, Commissioning and Site Acceptance Test (Test) to meet the contractual obligations, customers' needs and expectations? Please share your experiences	
11	Direct Current (DC) Systems	Please share an example of project where you have recently designed and implemented Direct Current (DC) Systems.  What components have you utilized e.g., DC Breaker, DC/AC Inverters, Power Converters while designing energy distribution solution(s).	Project Engineer and above
12	Packaging Solutions II	Have you executed a project with e-House or skid-based solution?  How do you select, and design skid based, and e-House based solutions?  What are all the challenges involved while designing, installing, and integrating modular prefabricated solutions? Please share some examples  How do you understand and document the functional requirements for designing "modular prefabricated solutions" to meet the contractual obligations, customers' needs and expectations? Please share an example.  Have you participated in Integrated Test, Commissioning and Site Acceptance Test (Test) to meet the contractual obligations, customers' needs and expectations? Please share your experiences  Please share an example of project where you have recently designed and implemented Skid-based solution. How was the skid structure designed – enclosure and transportation facility (lifting by crane, dragging by tractor)	Project Engineer and above



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#	Assessment Area	Assessment Questions	Applicability
13	Safety in Design	<ul> <li>How do you ensure "Safety in Design" as part of Design Freeze to meet Contractual requirements? Please provide examples e.g.</li> <li>Where to utilize "Normally Open (NO) / Normally Closed (NC) Contacts"</li> <li>Assessment of Breaking and Protection solution(s); Power System Protection practices</li> <li>Assessment of Arc Flash Protection and Mitigation solution(s)</li> <li>Understanding civil construction layout restrictions like pillars, beams, space constraints before finalizing the Switchgear panel layouts and General Assembly drawings.</li> <li>Understanding cable size and cable termination requirements to ensure whether the glanding requirements are taken care appropriately.</li> <li>Placement of lifting brackets, length of the four-part lifting chain/sling while designing structure of skid considering the center of gravity, weight of the components, and size of the skid.</li> <li>How do we ensure sustainability requirements of ABB and our Customers to meet Contractual requirements? Please provide examples E.g.</li> <li>How do we assure we do not use "Conflict Minerals "as part of the design process?</li> <li>How do we assure we do not use ABB List of Prohibited and Restricted Substances as part of packing and delivery?</li> <li>Utilization of products that have "Environmental Product Declarations" (EPDs)</li> </ul>	Project Engineer and above
14	Design Thinking	How is Design Thinking applied to solve problems that enhance Customer Experience? Please provide examples.  What are the key ingredients of design thinking? (Empathize, Define the problem, Ideate, Prototype and test)  How do you understand stakeholders' pain areas, needs and expectations? Please provide examples.  How do you conceptualize the engineering solutions based on customer needs and expectations and convert them into design? Please provide examples.  Have you created a working prototype of a full-scale engineering design solution and test its performance against all predefined standards before rolling it out to the full-scale design and engineering?  Please provide your insights on applying your Design Thinking skills during a problem-solving workshop? How has it benefited you individually? How has it helped your local business line?	Project Engineer and above



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#	Assessment Area	Assessment Questions	Applicability
15	Data Driven Insights	How do you explain Digital Mindset and Digitization?  Provide examples where you have performed Data Analytics on a portfolio of projects, and present a report based on insights from the data.  Please provide some examples where you have taken decisions based on your insights from data.  Please provide an example where you applied "storytelling through data driven insights", and convinced stakeholders to take desirable action by using relevant arguments?	Project Engineer and above
16	Engineering Risks and Opportunities	Identify the top five (5) risks from the last 3 projects related to project scope. What was you approach to mitigate these risks? Please explain.  How do you capture opportunities? Please provide examples.  What guidelines, tools and methods do you use to analyze technical risks and opportunities?  Please provide examples where you have mitigated major technical risk exposure as part of Design Freeze to meet Contractual requirements. e.g.  Where to utilize "Normally Open (NO) / Normally Closed (NC) Contacts"  Assessment of Breaking and Protection solution(s); Power System Protection practices  Assessment of Arc Flash Protection and Mitigation solution(s)  Understanding civil construction layout restrictions like pillars, beams, space constraints before finalizing the Switchgear panel layouts and General Assembly drawings.  Understanding cable size and cable termination requirements to ensure whether the glanding requirements are taken care appropriately.  Placement of lifting brackets, length of the four-part lifting chain/sling while designing structure of skid considering the center of gravity, weight of the components, and size of the skid.	Project Engineer and above
17	Influencing without Authority	Give an example of a design freeze meeting or difficult negotiation situation with Customer and how you managed it.  How do you perform stakeholder analysis; learn about Customer; document their priorities & expectations? Please provide some examples.  How do you learn about Customer organization & decision-making process, document sphere of influence for individuals on organization chart? Please provide some examples.  How do you ensure that you understand customer/contractor/ colleagues' perspectives and/or expectations? Please provide some examples.	Project Engineer and above



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#	Assessment Area	Assessment Questions	Applicability
18	Cyber-Security for Operational Technology (OT)	How do you define "secure-by-design principles" as part of Design Freeze with Customer to meet Contractual requirements? Please provide examples.  Please provide an example where you have applied ABB Minimum Cyber Security Requirements (MCSR) for Projects to meet contractual obligations.  Please provide examples where you have documented the "reference architecture" with appropriate placement of firewalls in the Operational Technology (OT) layers.  How do you perform Project Peer Reviews to ensure "secure-by-design principles" are incorporated or not? Please provide examples.  Please provide examples where you have ensured references to "information classification and handling for confidentiality" as part of document distribution and filing.  Please provide examples where you have applied "Hardening" techniques to Customers' IT infrastructure.  Please provide examples where you have ensured the cyber security sign-off and hand-over with the customer.	Senior Project Engineer and above
19	Digital Solutions Design and Implementation II	How do you understand and document the functional requirements for designing "Digital solutions" to meet the contractual obligations, customers' needs and expectations? Please provide examples.  Please share an example of project where you have recently designed and implemented Digital solutions. What applications/solutions have you utilized e.g., Power Management and Control Solutions (PMS), Paralleling Switchgear (PSG), eStorage OS, CognIEN, ADAM  Have you participated in Integrated Test, Commissioning and Site Acceptance Test (Test) to meet the contractual obligations, customers' needs and expectations? Please share your experiences  Please share an example where you have documented a case-study of Digital Solution(s) design and implementation.	Senior Project Engineer and above
20	Power Systems Studies	Please provide examples of initiatives to upgrade your understanding of "Safe, Smart and Sustainable Energy Distribution Solutions" to new levels during the recent past.  Please provide an example where you studied a "Power System Studies Report". What are your insights from this.	Senior Project Engineer and above



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21	Segment-specific Energy Distribution Solutions	What are recent trends outside ABB when it comes to new engineering solutions?  Please provide examples of initiatives to upgrade your understanding of "Safe, Smart and Sustainable Energy Distribution Solutions" based on these trends during the recent past.  How do you see market trends and likely needs and expectations of the customers by end of this decade (2030)?  Please provide examples where you have reduced complexity while providing segment-specific solutions to customers.	Senior Project Engineer and above
22	Design Verification	How do you assure that the engineering solution offered is meeting the Customer needs and expectations?  Please provide some examples where you have performed Design verification e.g., Calculation, independent assessment, peer reviews	Project Engineer and above
23	Agile / Lean Methodologies	Please provide an example where you have participated, initiated, or lead an Agile or Lean methodologies project e.g., reduce engineering lead time.  Please provide your insights on applying Agile or Lean methodologies? How has it benefited you individually? How has it helped your local business line?	Senior Project Engineer and above
24	Design for Excellence	How to assure the engineering solution offered is meeting the Customer needs and expectations?  How to modularize your engineering solutions?  Give examples of how you have designed and engineered cost-effective solutions that was within budget or better. How have you ensured safety, cyber-security, quality, and sustainability while designing this solution?  Please provide an example where you have participated, initiated, or lead a Design for Excellence project with an aim to reduce overall lead time of engineering and manufacturing and improve the quality of deliverables.  Please provide your insights on applying Design for Excellence methodologies? How has it benefited you individually? How has it helped your local business line?  How to ensure your solution is designed for safe, reliable, and cost-effective manufacturing?	Senior Project Engineer and above



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#	Assessment Area	Assessment Questions	Applicability
25	Coaching	<ul> <li>Please share your experiences where you were a coach to young professionals:</li> <li>Recognized the key strengths and development needs of individuals working in the team.</li> <li>Provided constructive feedback and advice on the individual's performance.</li> <li>Identified development needs for each of the team members.</li> <li>Encouraged team members to take up the development opportunities and maximize their potential.</li> <li>Demonstrated a desire to help others reach their potential.</li> <li>Applied coaching process learning to establish partnering relationships and build mutual commitment.</li> </ul>	Senior Project Engineer and above
26	Facilitating and Problem Solving	Please share your experiences where you facilitated a Design Thinking or Problem-solving workshop?  Please provide your insights on applying Facilitating skills during a Design Thinking or problem-solving workshop? How has it benefited you individually? How has it helped your local business line?	Senior Project Engineer and above
27	Consulting	How did you enrich the operation of other organizations using your own expertise during the recent past? Please provide example.  How do you facilitate the consultation process to achieve good results? How did you establish partnering relationships and build mutual commitment? Please provide examples  Please share your experiences while providing segment-specific solutions to customers during business development/pre-bid/marketing stages:  Created Personas to understand segment-specific stakeholders' pain areas, needs and expectations.  Identified market trends and likely needs and expectations of the customers  Actively engaged with Business Development team to learn a new segment / application.  Reduced complex situations to a few core priorities in pursuit of major strategic objectives  Anticipated challenges and opportunities from the perspectives of different cultures and nationalities  Maintained a positive approach and resilience when there are setbacks/failure/changes in circumstances  Demonstrated tenacity and persistence while implementing the strategies to achieve the business vision.	Senior Project Engineer and above