

## Developing Technical Capability of PETRONAS' Pipeline Engineers

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### **Abstract:**

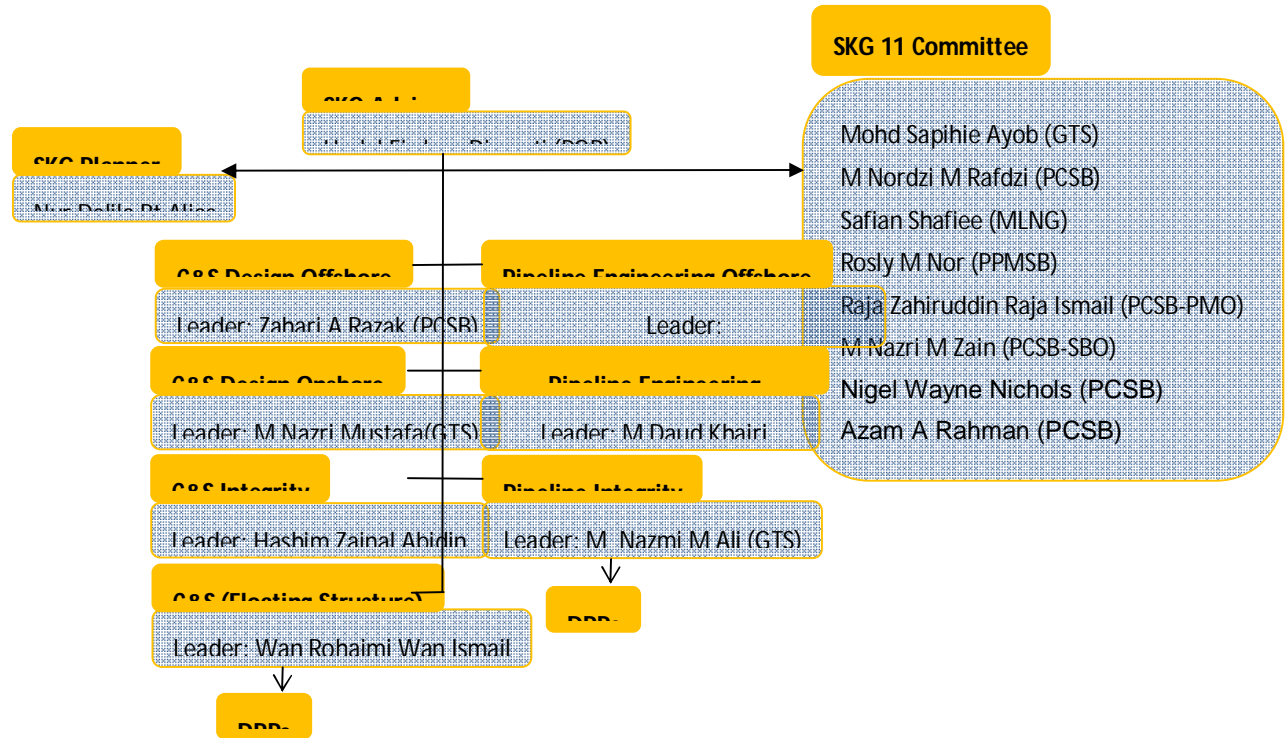
#### **1.0 Background**

PETROLIAM Nasional Berhad or PETRONAS is Malaysia's national oil and gas corporation that operates in more than thirty countries around the world and have more than 30,000 employees; puts the utmost important focus on development of its employees to ensure that its assets are managed safely, reliably and efficiently in delivering the intended business results. The development of its technical personnel i.e. the engineers and technicians is being realised by having specific skill group for specific engineering/technical discipline. There are eight engineering/technical disciplines and pipeline engineers and technicians belong to Skill Group 11 (SKG 11) which is Civil, Structure and Pipeline (CSP) engineering skill group.

#### **2.0 Structure of Skill Group**

Each skill group is headed by a Skill Group Advisor (SKG Advisor) whom is a senior management or senior technical personnel that possesses some technical background and experiences in the related engineering/technical discipline. The SKG Advisor is assisted by a Technical Planner on a full time basis. Under the SKG Advisor, there are a number of disciplines and each discipline is led by a Discipline Head (DH). Each discipline has a group

of Discipline Resource Persons (DRPs) that assist the DH in the development of engineers and technicians. The DH and DRPs consist of experts in the relevant discipline and they are on voluntary basis. Typically, the DH and DRPs come from all over PETRONAS. Figure 1 shows the organisation structure of SKG 11.



**Figure 1: Organisation structure of SKG 11 Civil, Structure and Pipeline Engineering**

### 3.0 PETRONAS' Technical Development Framework

The PETRONAS' technical development framework consists of the following elements:-

- Technology Inventory and Ruler (TI&R)* – provides the Base, Key, Pacing and Emerging technologies and competency levels for each group of technology (as above) for specific engineer level i.e. entry level, junior, senior, staff, principal and custodian engineers.
- TI&R Descriptors* – provides the detail description of each technology at specific competency level i.e. Awareness, Knowledge, Advance and Expert levels.
- Skill Group Development Modules (SGDM)* – provides level 1, 2 and 3 comprehensive training modules.
- Training Road Map (TRM)* – provides summary of trainings that need to be attended by specific level of engineer along specific time frame.
- Baseline Assessment* – technical assessment undergone by engineer normally assessed for all Base and Key technologies.
- Annual Assessment* – technical assessment undergone by engineer normally assessed for the identified technology gaps.



- vii. *Coaching Program* – each engineer is assigned a coach who is normally an experienced senior level engineer.
- viii. *ASCENT* – an on-line computerised web-based tool that enables superior, coach and engineer to manage the engineer’s technical development.
- ix. *Technical Professional Career Progression (TCP)* – a career progression program for engineers that are interested in pursuing his or her career into the technical career ladder as suppose to managerial career ladder.

Technology Inventory	level 1	Level 2			Level 3		Level 4 Staff			Level 5 Principal			Level 6 Custodian	
		E1		E2		E3			E4			E5		
	20	21	22	23	24	E	25	26	E	27	28	E	29	
Base	1 Front-End Engineering	1	1	2	2	2	2	2	2	2	3	3	3	3
	2 Mechanical Design	1	1	2	2	2	2	3	3	3	4	4	4	4
	3 Stress Design	1	1	2	2	2	2	3	3	3	4	4	4	4
	4 Shore Approach	1	1	1	1	2	2	2	2	3	3	3	3	3
	5 Corrosion Control & Monitoring	1	1	1	2	2	3	3	3	4	4	4	4	4
	6 Construction & Commissioning	1	1	2	2	2	2	2	3	3	3	3	3	3
	7 Pipeline Integrity Management Systems (PIMS)	1	2	2	3	3	3	4	4	4	4	4	5	5
	8 Risk Based Integrity Planning	1	2	2	2	3	3	3	4	4	4	4	4	5
	9 Inspection & Maintenance	1	2	2	3	3	4	4	4	4	4	4	4	5
	10 Fitness for Service Assessment	1	2	2	2	3	3	3	4	4	4	4	4	4
	11 Repair and Rehabilitation	1	2	2	3	3	3	3	3	4	4	4	4	4
Key	1 Pipeline Project Engineering	1	1	1	2	2	2	2	2	2	3	3	3	3
	2 Pipe & Bend Manufacturing and Procurement	1	1	1	2	2	2	2	2	2	3	3	3	3
	3 Data Management Systems	1	1	2	2	2	2	3	3	3	4	4	4	4
	4 Corrosion Resistant Materials	1	1	1	2	2	2	2	3	3	3	3	3	3
	5 Quantitative Risk Assessment		1	1	2	2	2	2	3	3	3	3	3	4
Pacing	1 Deepwater & Flexible Pipeline / Risers Design		1	1	1	1	1	1	1	2	2	2	2	2
	2 Deepwater Pipeline / Risers Inspection & Repair		1	1	1	1	1	1	1	2	2	2	3	3
	3 Reliability Based Methods		1	1	1	2	2	2	2	2	2	2	3	3
	4 High Pressure High Temperature Pipelines				1	1	1	1	1	2	2	2	2	2
	5 Remote and Real Time Monitoring of Pipelines				1	1	1	2	2	2	2	2	2	2
Emerge	1 Advanced Pipeline Material Applications						1	1	1	1	1	1	2	2
	2 Advanced Inspection and Maintenance				1	1	1	1	1	2	2	2	2	2
	3 Ultra deep water and Arctic Pipelines / Risers						1	1	1	2	2	2	2	2

Figure 2: TI&R for Pipeline Integrity discipline

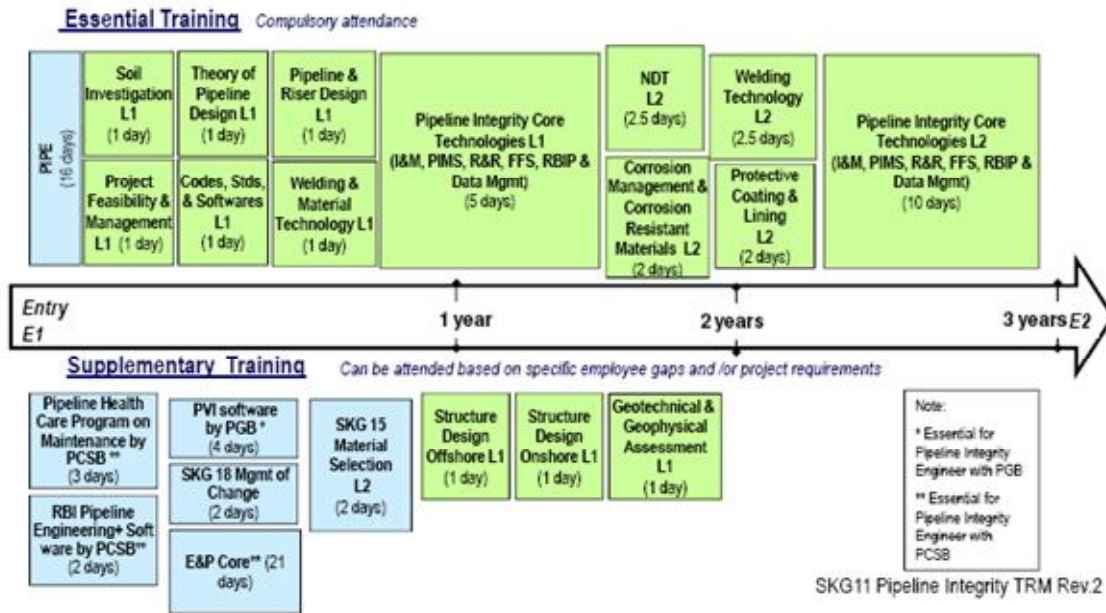


Figure 3: Excerpt from TRM for Pipeline Integrity discipline

Assessment No	Staff No	Name	Assessment SKG	Assessment Discipline	Assessment Sub-Discipline	SG	Pending Review	Reviewed
03012011/3	67342	Kamaruddin - Saat	SKG 11: Civil and Structural Engineering	Pipeline Engineering	Integrity	E2	0	1
13072010/2	116348	Sani - Sulaiman	SKC 11: Civil and Structural Engineering	Pipeline Engineering	Integrity	E2	0	1
04082010/3	123113	Sabri - Ishak	SKG 11: Civil and Structural Engineering	Pipeline Engineering	Integrity	E2	0	1
22122010/3	123269	Mohd Najib - Ahmad	SKG 11: Civil and Structural Engineering	Pipeline Engineering	Integrity	E1	0	1
22122010/3	126473	Mohd Shamil - Abdul Samat	SKG 11: Civil and Structural Engineering	Pipeline Engineering	Integrity	E1	0	1

Search Criteria:  
 OPU: PETRONAS Gas Berhad  
 Division: Transmission Operation Division  
 Department: -- Select --  
 Name: -- Select --  
 Assessment SKG: SKG 11: Civil and Structural Engineering  
 Assessment Discipline: Pipeline Engineering  
 Assessment Sub-discipline: Integrity  
 Staff No: -- Select --

Figure 4: Snapshot from PETRONAS' ASCENT on-line technical development management tool

In conclusion, PETRONAS has a structured framework together with its associated programs for the development of its engineers. This ensures that the engineers maintain their loyalty with the organization and that their career progression is flexible i.e. either managerial or

technical. The technical development programs also create excitement for engineers to perform at the best level in delivering the business objectives.