

Cost Comparison: Sponge-Jet versus Garnet Blasting

Project 810

Prepared by:



Tanjung Offshore Services Sdn Bhd.
Material, Corrosion, Inspection and Maintenance (TOS – MCIM)

Introduction

- Most maintenance work is a combination of blasting and painting activities
- The objective of blasting is to prepare the maintenance surface area for coating
- The quality of blasting shall affect the coating work
- 40% - 50% of total project schedule is filled by blasting activity

Case Study: Upstream



Case Study: Upstream

Project Detail:

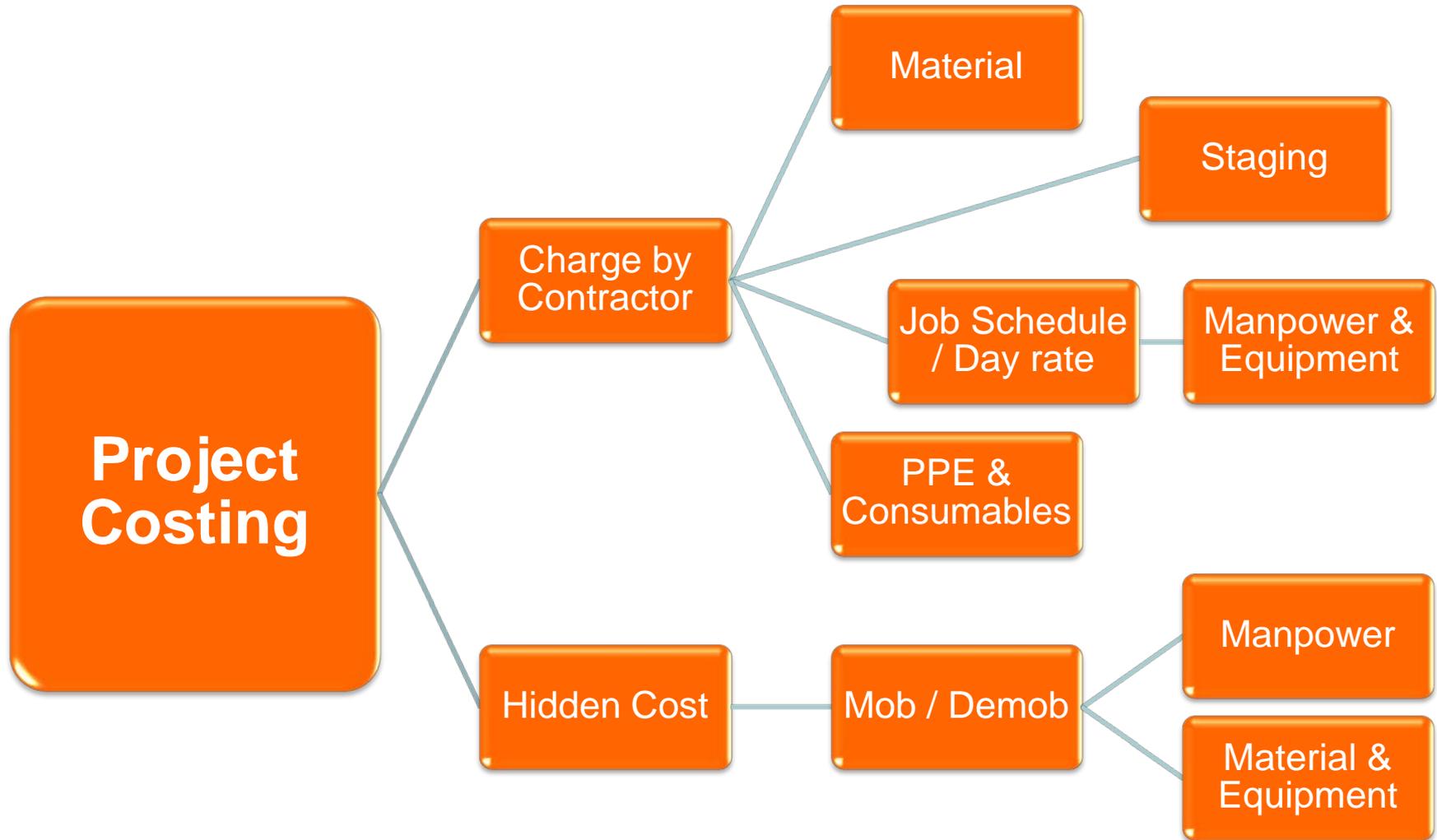
- (1) Blasting and painting work for piping and infrastructure at main, mezzanine, and cellar decks of Offshore Installation Platform
- (2) **Area:** 100m² (1,075ft²)
- (3) **Concern:** Compressor, generator located at main and mezzanine decks
- (4) **Requirement:** Level of Cleanliness SA 2.5 / SP-10 / NACE 2 Near-White Blast Cleaning with a Surface Profile of 75microns (3mils)

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Information:

- (1) One Blaster can achieve surface preparation (SA 2.5 /SP-10 / NACE 2 New-White Blast Cleaning and Surface Profile 75microns (3mils)) up to 20-25m² (per 12-hour day), using about 1.2 tons of 30/60 mesh garnet at offshore installation
- (2) Blast rate is about \$3.50USD/hr (Basic salary + allowances)
- (3) Mobilization and demobilization averages \$500USD per person
- (4) Average cost for mobilization and demobilization equipment is about \$350USD/hr per vessel

Case Study: Upstream



Case Study: Upstream

Media Vs Garnet Costing:

	Sponge Silver #30	Garnet 30/60
Weight Propelled / 1m ²	36kg	45kg
Recycle	10 times	No
Total weight needed	360kg	4500kg
Price USD/kg	0.67	0.40 (average)
TOTAL (USD)	2,412.00	1,800.00

- Significant reduce in weight for Sponge Media™ abrasives
- Sponge Media can achieve an SA 2.5 and a 75micron (3mil) profile with one swipe, which accordance to Sponge-Jet operational standards
- Chloride contaminants are also removed by Sponge-Jet Surface Preparation, which eliminate subsequent wash-down work

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Staging Costing:

	Sponge-Jet	Conventional Blasting
Containment Area (Scaffolding, netting, barricading)	278.00	167.00
Dust Collection (vacuum)	417.00	No
Disposal Cost	50.00	No
TOTAL (USD)	745.00	167.00

- All used Sponge Media™ abrasives will be collected by vacuum
- The collected Sponge Media is put into the Sponge-Jet Recycler and segregated between:
 - Reusable Sponge Media
 - Fine particulate, paint, dust, metal and etc. (where this waste is treated according to Malaysian Law)

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Job Schedule & Work Efficiency

	Sponge-Jet	Conventional Blasting
Allow other trade to work (piping, coating, welding, etc.)	Yes (low dust)	No (at least 10m radius)
Increase Blaster Productivity	Yes (low dust + low fatigue)	No (dusty + need 10-15 minutes to settle dust)
Effective Working Time (12 hours)	91%	87.5%
Nozzle Efficiency	Saber Blast – 95%	6" Nozzle – 88%
Over Blast and Reworks	1%	12%
Worker Headcount	3 (Centralize Control)	4
Total Project Day Required	12	15

- Significant job day reduction for Sponge-Jet due to low dust while application, allows other trade to work nearby (such as coating, piping, etc.)

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Example of Job Schedule:

JOB SCHEDULE FOR OFFSHORE MAINTENANCE			AREA: 100 sqm of Piping and infrastructure																			
			LOCATION: Main, Mezanine and Cellar Deck																			
No			ACTIVITY			CORCERN: Nearby equipment (e.g. Compressor & Generator)																
						NO OF DAYS																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Mobilisation to Offshore			xxxx																			
2.1	Sponge Jet	Preparation Material & Equipment		xxxx																		
2.2		Scaffolding / Rigging			xxxx	xxxx																
2.3		Blasting / Inspection					xxxx	xxxx	xxxx	xxxx												
2.4		Painting							xxxx	xxxx	xxxx	xx										
2.5		Inspection								xxxx	xxxx	xx										
2.6		Dismantle Scaffolding/ HouseKeeping											xxxx	xxxx								
2.7		Demobilisation														xxxx						
Mobilisation to Offshore			xxxx																			
3.1	Garnet	Preparation Material & Equipment		xxxx																		
3.2		Scaffolding / Rigging			xxxx	xxxx																
3.3		Blasting / Inspection					xxxx	xxxx	xxxx	xxxx	xxxx											
3.4		Painting								xxxx	xxxx	xxxx	xxxx	xxxx								
3.5		Inspection										xxxx	xxxx	xxxx	xxxx							
3.6		Dismantle Scaffolding/ HouseKeeping														xxxx	xxxx					
3.7		Demobilisation																	xxxx			

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Manpower and Equipment Costing:

	Sponge-Jet (3pax & 12 days)	Conventional Blasting (4pax & 15 days)
Manpower	1,500.00	2,500.00
Equipment		
•Compressor	833.00	1,042.00
•Blasting Equipment	2,222.00	2,778.00
•After-cooler	555.00	778.00
•Recycler	500.00	
Total USD (equipment)	4,110.00	4,598.00

- All costs are bases on the day rate charge

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PPE & Consumables:

	Sponge-Jet	Conventional Blasting
Helmet, Gloves, Clothing	1,000.00	2,000.00
Lens Replacement	140.00	278.00
Other consumables	278.00	415.00
Total (USD)	1,418.00	2,693.00

- Sponge Media reduces ricochet (rebound) which allow blaster to wear face visor and mask only
- This significantly reduces the cost for lens replacements
- Full PPE for conventional blasting increases the blaster fatigue, thus reducing the surface preparation productivity

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Total Cost to Pay to Contractor

	Sponge-Jet	Conventional Blasting
Material (media & garnet)	2,412.00	1,800.00
Staging	745.00	167.00
Manpower	1,500.00	2,500.00
Equipment	4110.00	4,598.00
PPE & Consumables	1,418.00	2,693.00
Total (USD)	10,185.00	11,758.00

Case Study: Upstream

Hidden Cost bare by Customer:

	Sponge-Jet	Conventional Blasting
<u>Manpower Mob / Demob Cost</u>		
Job Schedule	12 days	15 days
Man Power Mob/Demob (a)	1 time	1 times
Cost Manpower Mob / Demob	1,500.00	2,000.00
<u>Material & Equipment Mob / Demob Cost</u>		
Material & Equipment Mob/Demob	1 time	2 times
Cost Material & Equipment Mob/Demob	4,167.00	6,250.00
Total Hidden Cost	5,667.00	8,250.00

- Sponge-Jet Media save in term of mobilization/demobilization cost of material (Media only need about 360kg compare to garnet, 4500 kg)

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Grand Total Cost:

	Sponge-Jet	Conventional Blasting
SUBTOTAL JOB COST CHARGE BY CONTRACTOR	10,185.00	11,758.00
HIDDEN COST	5,667.00	8,250.00
GRAND TOTAL COST (USD)	<u>15,582.00</u>	<u>20,008.00</u>

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	Sponge-Jet	Conventional Blasting
GRAND TOTAL COST (USD)	<u>15,582.00</u>	<u>20,008.00</u>
Total price / m²	155.82	200.00

Sponge-Jet reduced cost per square meter and the entire project cost for this upstream project by

22.5%

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Point to Ponder in the Comparison:

- (1) **Garnet price:** USD \$.40/kg (which is priced from supplier), market price should be higher
- (2) For a blasting job:
 - Sponge-Jet requires **three manpower:**
Blaster + Signal Man + Standby man
 - Conventional blasting requires **four manpower:**
Blaster + Signal Man + 2 Standby men
- (1) **Job schedule** is reduce up to three days for 100m². The higher the area, the bigger Sponge-Jet can save
- (2) **Weight ratio** for abrasive material for both Sponge-Jet Silver 30 Media and Garnet 30/40 is 360: 4,500 kg or 1:12

Approval



PETROLIAM NASIONAL BERHAD (20076-K)

Ref. No. PCLTC/09/AB/AL003

Tanjung Offshore Services Sdn Bhd (100697-T)
No. 8-3, Jalan Puncak Setiawangsa 4,
Taman Setiawangsa,
54200 KUALA LUMPUR

ORIGINAL

Date: 19 February 2009

Attention: Encik Mazrin Ramli
Senior Manager,
Materials, Corrosion, Inspection & Maintenance

Dear Sir,

Re : Approval for application of Sponge-Jet abrasive blasting system for surface cleaning and surface preparation.

Refer to your letter dated 13 February 2009 on the above subject and technical proposal reference no. TP001/09/TOS/TP Rev 0 dated 19 Jan 2009.

PETRONAS and the oil and gas industry recognised and accepted Sponge-Jet abrasive blasting as one of many dry abrasive blasting methods for surface cleaning and/or preparation methods. Aluminum oxide the most common abrasive used in the media is classified under ISO standards related to protective paint systems. We approve their use and application in our construction and maintenance activities where it is appropriate and economical. Details of the approved abrasive blasting system are as follows:

Screening For Long Term Contract

TELEFAKS/TELEFAX



PETRONAS CARIGALI SDN BHD
 OPERASI SARAWAK, PCSB BUILDING
 98100 LUTONG, PETI SURAT 1452, 98008 MIRI, SARAWAK
 TEL: 085-470000 TELEKS: MA74074 TELEFAKS: 085-475777

TO	: TANJONG OFFSHORE SERVICES SDN BHD	DATE	: 17 March 2009
ATTN	: EN HALMI KHALID	REF NO.	: FX-SE-Q25-09-MI
C.C	:	FAX NO.	:
NO. OF PAGES	: 4 (including cover page)	FAX NO.	: 03-42523888
FROM	: TENDER SECRETARY PETRONAS CARIGALI SDN BHD, SARAWAK OPERATIONS	TEL. NO.	: 03-42521805

TENDER NO. : SKO/2009/BME1/090

80602334 80622334

TENDER TITLE : PROVISION OF SPONGE JET AND ADVANCED EPOXY REINFORCED WITH CERAMICS (ARC) COATING SERVICES FOR PETRONAS CARIGALI SDN BHD - SARAWAK AND SABAH OPERATIONS (SKO & SBO) FOR A PRIMARY PERIOD OF THREE (3) YEARS WITH ONE (1) YEAR EXTENSION OPTION

SUBJECT : SCREENING EXERCISE

PETRONAS Carigali Sdn Bhd, Sarawak Operations is planning to establish a contract for the Provision of Sponge Jet and Advanced Epoxy Reinforced with Ceramics (ARC) Coating Services for PETRONAS Carigali Sdn Bhd - Sarawak and Sabah Operations (SKO & SBO) for a primary period of three (3) years with one (1) year extension option.