CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

- Six Sigma methodologies become the way of life to generate improvement at PT ABC in each step of the process.
- By implementing the lean manufacturing concept at fabrication area with the less capital spending, PT ABC increased the production capacity by 45% from 660 machines per year to be 960 machines per year (the estimated improvement with less capital was 10%).
- Cycle Efficiency (CE) improved significantly by 22.4% from 16.1% to 19.7%. The improvement came from the reducing of work in process and balancing the cycle time at the constrain line in fabrication process.
- Value Stream Map is a useful tool to identify the source of non-value added activities in the current processes and wastes at fabrication process. The total value proportion for the benefit to the PT ABC around US$ 1.65 million from the increasing additional sales for 330 machines for one year.
- After reviewing the condition after improvement, the total capital spending needed to support 1700 machines per year is US$ 2,269,500. From this study, PT ABC could save the spending of US$ 1,980,500 (from US$ 4,250,500).
- Future Value Stream Map in the hydraulic excavator line has improved and been more focus with flows to the customers, and introduced the new concepts for:
    - Stability, everything starts and ends with customer: quality, lead time, and price.
    - Flow, the objective is to minimize idle time and stagnation of work in process in the production line.
    - Pull, all material flows are triggered by next process demand and consumption.
    - Level, evenly distribute production by volume.

- PT ABC has an opportunity to deliver the product to ASEAN market by focusing on the local capability to support RVC with competitive cost structure, replicated supply based from success competitors as a quick win in the localization strategy. The parts that have the opportunities to be studied for localization to get more than 40% content is cabin for the operator.

5.2 Recommendations

The development of increasing capacity for hydraulic excavator type 20 ton at PT ABC is feasible and profitable, in order to keep the company's performance. In order to make the project investment study more effective the following recommendations are presented below:

- The improved process at fabrication level to increase the capacity by lean concept could be continued after the investment executed, in order the company get more benefit to the investment.
- To support the demand growth and ensure the stable processes in the future, the supply base and operating performance should be maintained to achieve 97% performance on committed ship date to the customers. (measure for on time delivery date to the dealer)
- Beside focus on the operation side, PT ABC should review to supply chain strategy in future, since the business competition become more complex. Key metrics for supply chain such as percentage pull system, supplier delivery performance, and inventory record accuracy should be maintained to achieve 95%.
- Pull replenishment system for raw materials from the suppliers should be implemented and supported with collaboration system information between suppliers and PT ABC. By implementing the pull system PT ABC could maintain the level of inventory as the requirement from the production line and made the processes effectively.
- The technology for the fabrication process should be improved in the next 10 years, since the some tools and equipment would be obsolete and decrease in its performance.

- Since the market demand of hydraulic excavator in Indonesia and South East Asia are very high especially for large type, PT ABC should study the possibility to build large type such as 30 – 45 Tons, with considering the segment of mining business.
- The strategic business became the leader in Asia could significant impact for worldwide market.
- The sourcing strategy under supply chain strategy should be developed in Indonesia to support the increasing demand and capacity in the future by reviewing the localization program as well as moved small and medium fabrication parts and sub assembly to the domestic suppliers and PT ABC could focus on key components and complex processes.
- Fabrication process as a good opportunity for PT ABC's business in the future by managing the production performance and cost, export components to other group facility in India or China as one option to keep the production in full capacity with considering to Free Trade Agreement.
- Increasing the performance at production line using world class system needs to focus on the safety and people development, product and process quality Improvement, increase the velocity of product to the customers, and managing the cost efficiently.
- The future demand of hydraulic excavator in Indonesia indicated positive growth and based on the analysis of investment for increasing the production capacity for 1,700 machines per year at PT ABC is financially profitable. This are indicated from the positive NPV and IRR above 16 %. The analysis below would give the more detail recommendation on the financial aspect:

5.2.1 Investment Analysis Recommendation

The investment decision to support increasing capacity from 960 to 1700 machines per year required to support with the increasing the demand that exceeded from the improved production capacity for 960 machines per year, The fabrication process required additional tooling support to met with customers demand.

The table 5.1 is the breakdown on the investment plan to support production growth for 1700 units per year, with the total capital budget required is US$ 2,269,500.

With the internal rate of return, the cash flows are identified. Then the discount rate (rate of return) that equates the present value of the cash flows with the present value of the outflows is determined. The internal rate of return is then compared with a specified discount rate to determine whether the proposal is acceptable from an economic standpoint. With the net present value, the cash flows are identified and are discounted using a specified discount rate to determine the net present value. The proposal is economically acceptable if the net present value is equal to or greater than zero.

Table 5.1 PT ABC Capital Investment Plan

PT ABC Investation Plan for HEX	Capacity Req/year	1700			
Fabrication	**Process**	**Tool Required**	**Qty (set)**	**Est. Cost**	**Capital Cost**
Stick As and Link	Welding	Tack Fixture	1	$20,000	$20,000
		Full positioner	2	$7,000	$14,000
		Welding Machine	3	$10,000	$30,000
		Tools	1	$15,000	$15,000
	Machining	Makino MCF4025 - Fixture	1	$500,000	$500,000
Swing Frame	Welding	Stand	2	$1,000	$2,000
		Positioner Main Frame	1	$8,000	$8,000
		Tack Weld Fixture SF	2	$35,000	$70,000
		Positioner Swing Frame	2	$10,000	$20,000
		Welding Machine	4	$10,000	$40,000
		Tools	1	$5,000	$5,000
Boom	Welding	Full Weld Fixture Center	1	$15,000	$15,000
		Full Weld Positioner - Front	1	$7,000	$7,000
		Tack Weld Fixture - Boom	1	$45,000	$45,000
		Positioner - Boom	1	$35,000	$35,000
		Welding Machine	4	$10,000	$40,000
		Tools	4	$5,000	$20,000
Base Frame	Welding	Stand Weld	1	$1,500	$1,500
		Positioner Carbody	2	$60,000	$120,000
		Full Weld Positioner - BF	1	$15,000	$15,000
		Welding Machine	4	$10,000	$40,000
		Tools	4	$5,000	$20,000
Counterweight	Welding	Positioner	1	$15,000	$15,000
	Filling	Filling Station	1	$90,000	$90,000
		Welding Machine	2	$10,000	$20,000
Assembly & Painting	Assembly	Air Tools	18	$1,500	$27,000
		Support Pallet	1	$15,000	$15,000
		Painting Line	1	$1,000,000	$1,000,000
		Lifting Device	1	$20,000	$20,000
				Sub Total	**$2,269,500**

Source: Project Analysis at PT ABC

Investments with an IRR less than the cost of debt (currently 5%) do not allow for the repayment of debt and would always be unacceptable from a strict economic viewpoint.

Investments with an IRR between 5% and 10% would exceed our cost of debt, but would not support our WACC. Thus, shareholder value would deteriorate, which would be unacceptable from a strict economic viewpoint.

Investments with an IRR between 10% and 16% would exceed our WACC and increase shareholder value, but not provide the overall return needed to meet our enterprise financial targets.

Investments with an IRR of 16% (and above) achieve the minimum desired return to support our enterprise financial targets. Appropriate quantification of risk should be included in the discounted cash flows, as the 16% hurdle rate is to be met under the most realistic business case.

After review with the calculation, the project acceptable with IRR results is 19.6% and NPV US$ 4,700,000.

Table 5.2 PT ABC Investment Analysis

input	Project Information	NEW DCF MODEL v.10SEP2009											
1	Project Name:	PT ABC HEX Investment	TOBE - Base Case										
2	Project Number:	MBA 2008 - 001	description										
3	Business Unit:	Jakarta - Indonesia	description										
	Valuation Date (mm/dd/yy)	12/31/10											
	End of first partial year	12/31/10											
	Remaining first forecasted year ratio	0.000											
	Project Valuation # of Years	10.0	Years of Study Life = 10.0										
		INITIAL	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
	1,000 Year	12/31/10	12/31/11	12/31/12	12/31/13	12/31/14	12/31/15	12/31/16	12/31/17	12/31/18	12/31/19	12/31/20	
	Year Index	0.00	1.000	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	
	Year Index	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	
	Cash Flow												
	Total Revenue	$ -	$ 22,849	$ 72,070	$ 73,728	$ 75,424	$ 77,158	$ 78,933	$ 80,748	$ 82,606	$ 84,506	$ -	$
	Total Expenses	$ -	$ (21,127)	$ (66,641)	$ (68,174)	$ (69,742)	$ (71,346)	$ (72,987)	$ (74,665)	$ (76,383)	$ (78,140)	$ -	$
	Capitalized Interest	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$
	Depreciation	$ -	$ (324)	$ (556)	$ (397)	$ (284)	$ (202)	$ (202)	$ (202)	$ (101)	$ -	$ -	$
	Operating Profit (PBT)	$ -	$ 1,397	$ 4,873	$ 5,157	$ 5,398	$ 5,610	$ 5,744	$ 5,881	$ 6,121	$ 6,366	$ -	$
	Taxes	$ -	$ (531)	$ (1,852)	$ (1,960)	$ (2,051)	$ (2,132)	$ (2,183)	$ (2,235)	$ (2,326)	$ (2,419)	$ -	$
	Profit After Tax	$ -	$ 866	$ 3,022	$ 3,197	$ 3,347	$ 3,478	$ 3,561	$ 3,646	$ 3,795	$ 3,947	$ -	$
	Add: Depreciation & Amortization	$ -	$ 324	$ 556	$ 397	$ 284	$ 202	$ 202	$ 202	$ 101	$ -	$ -	$
	Add: (Increase) Decrease in Working Capital	$ (4,225)	$ -	$ (9,006)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,987	$
	Less: Capital Expenditures	$ (1,702)	$ (567)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$
	Total After Tax Cash Flow	$ (5,928)	$ 623	$ (5,428)	$ 3,594	$ 3,631	$ 3,681	$ 3,764	$ 3,848	$ 3,897	$ 3,947	$ 15,987	$
	Cumulative Total After Tax Cash Flow	$ (5,928)	$ (5,305)	$ (10,733)	$ (7,138)	$ (3,508)	$ 173	$ 3,936	$ 7,785	$ 11,681	$ 15,628	$ 31,616	$
	Continuous Discounting Mid Year Cash Flow Assumptions												
	Present Value of After Tax Cash Flow	$ (5,928)	$ 575	$ (4,270)	$ 2,409	$ 2,074	$ 1,792	$ 1,561	$ 1,360	$ 1,174	$ 1,013	$ 3,497	$
	NPV @ 16%	$ 4,700											
	IRR	19.6%											
	Book Operating Profit (before taxes)	$ -	$ 1,515	$ 5,037	$ 5,203	$ 5,372	$ 5,544	$ 5,719	$ 5,897	$ 6,079	$ 6,263	$ (62)	$

Go To SETUP

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One Page DCF Detail Calc Description:
The DCF detail calc worksheet contains the assumptions, inputs for revenue
flow. Only those cells indicated as input cells according to formatting sho

Source: Project Analysis at PT ABC