

Minimising Operational Risk in Mining & Process Industries through the Business Improvement Strategy of TPM & Lean (TPM³)

BANPU The Asian Face of Energy is a Thailand energy company with coal mining operations spanning Thailand, China, Indonesia and more recently Australia following their purchase of Centennial Coal in September 2010. Banpu is now referred to in the local media as Asean's largest coal miner.

In 2002 Banpu decided to use the Japanese developed Total Productive Maintenance (TPM) methodology as its Business Improvement strategy to minimise its Operational Risk along with maximising its current capacity, minimising costs and most importantly creating a safe and productive culture at its mine sites. They choose their Lampang Open Cut Coal Mine in Thailand as the pilot site. In 2004 the Lampang site realised the Japanese had very limited knowledge about mining and appeared hesitant in allowing their site to apply for the Japanese TPM Excellence Award - an improvement goal set by the CEO.

After researching the internet, they approached CTPM Australasia who had developed an Australasian approach to TPM in 1998 which they called TPM³ to distinguish from the Japanese version, and had been successfully using their approach in a range of mines within Australia. In 2002 CTPM had developed a 5 Level Milestone TPM³ Excellence Award which Banpu saw as a critical element in getting their sites to strive for World Class Performance in business improvement and thus minimise their Operational Risk.



Banpu had recognised for a site to become World Class it needed 3 imperatives in place:

- an external, internationally recognised, 'Gold Medal' to strive for (5 Level Milestone TPM³ Excellence Award as the Improvement Vision for the site) ;
- a great coach with a proven training & development plan covering all employees that spanned 3-5 years (TPM³ Master Plan spanning 15 cycles / 5 years); and
- a process to establish the discipline within the site to follow the proven training & development plan (team approach progressively engaging all employees).

CTPM's initial audit in 2004 at the Lampang site verified they were at Level 2 status and over the following 3 years they advanced to become the first site in the world to achieve Level 5. The impact on performance at the time of the Level 5 verification audit in May 2007 was that the site had achieved **517 days accident free** and **reduced average maintenance cost by 50%**.



Other improvements from the 2002 baseline included:

- Reduced Plant 2 product oversize by 98%
- Reduced Plant 1 maintenance costs by 64%
- Reduced Plant 2 maintenance costs by 86%
- Reduced Conveyor System maintenance costs by 36%

Following the success at Lampung, the next challenge set by the Banpu executive team was for their main Indonesian Coal Operation to achieve Level 5 of CTPM's 5 Level Milestone TPM³ Excellence Award within 5 years. This involved the Tandung Mayang Open Cut Coal Mine and their Indominco Coal Processing Operation & Port Facility. In June 2010 Tandung Mayang achieved Level 3 with 75 Production and 25 Maintenance Area Based Teams progressing TPM³ development activities supported by numerous Cross-functional Teams resulting in some impressive results (see fact sheet attached). They also reported a significant impact on safety and productivity behaviours.



Following the feedback session after the Level 3 verification audit at Tandung Mayang to the Banpu executive team in the Thailand Head Office, it was decided to expand TPM³ activities across more of their operations with their Trubaindo Open Cut Coal Mine in Indonesia commencing immediately.

A key element of Banpu's success is their top management involvement in promoting and supporting their TPM³ Activities as seen in the attached photo of Chanin VongKusolkrit Director / Chief Executive Officer / Head of Risk Management Committee visiting Tandung Mayang site to get a first hand briefing on their TPM³ activities.



Banpu's Risk Management Policy

According to Banpu's risk management policy, any hazard or uncertainty event that threatens the Company's achievement of business objectives or business plans shall be managed in a systematic manner and in accordance with the risk management best practices, in order to protect the Company from losses and to capture opportunities

TPM Fact Sheet

Program: Total Productive Maintenance / Mining (TPM³)
Site: Tandung Mayang Open Cut Coal Mine (13mtpa – 880 people)
Starting Date: November 2006
Reporting Date: 29 June 2010

Key Achievements	2007	2008	2009	2010*	Gain
5 Level Milestone TPM³ Excellence Award		Level 1 <i>28 Sept</i>	Level 2 <i>16 Sept</i>	Level 3 <i>29 June</i>	
Production Improvement					
- EX2500 (BCM/hr)	937	970	1,092	1,175	25%
- PC1250 (BCM/hr)	-	444	558	614	38%
- OB Haul Distance (km)	1.87	1.48	1.31	1.34	28%
- OB Dump Volume (M.BCM)	24.10	35.26	51.61	22.51*	114%
- In-pit Dump Volume (M.BCM)	6.21	19.01	32.47	16.89*	429%
- Percent In-pit Dump (%)	26	54	63	75	188%
People Development					
- Cross-functional Teams Completed	6	24	171	243	
- One Point Lessons Created	249	857	944	984	
- Employee Attendance (%)	97.7	98.9	99.3	99.6	
Business Outcome					
- Fuel Consumption (Liter/BCM)	0.96	0.93	0.82	0.81	15%
- Fuel Consumption (Liter/BCM/Km)	0.72	0.78	0.73	0.70	3%
- Cost Reduction against budget (USD)	-	-	\$5,130k	\$6,366k ¹	

Remark:

*As of May 2010

World Class Rate of EX2500 (PAMA Standard) = 1,100 BCM/hr

World Class Rate of PC1250 (PAMA Standard) = 550 BCM/hr

	2005	2006
EX2500 (BCM/Hour)	708	817
Employee Attendance (%)	97.3	95.7

¹ 2010 Outlook

Banpu's overall company performance over the past 5 years as reported to its shareholders is very impressive, especially in light of the global financial crisis. Having a risk minimisation strategy for Operations involving TPM is playing an important role in supporting the ongoing growth and financial success of the business.

Taken from Banpu information on Settrade web page: www.settrade.com

	30/09/10 **	31/12/09 **	31/12/08 **	31/12/07 **	31/12/06 **
Assets (M.Baht)	185,752.81	101,416.77	89,361.80	65,050.80	49,386.48
Liabilities (M.Baht)	109,206.80	45,465.13	43,827.76	26,553.51	27,042.56
Equity (M.Baht)	61,984.65	48,429.10	40,486.96	34,309.02	21,931.14
Paid-up Capital (M.Baht)	2,717.48	2,717.48	2,717.48	2,717.48	2,717.48
Revenue (M.Baht)	62,220.24	69,071.43	56,833.14	39,436.72	35,496.06
Net Profit/Net Loss (M.Baht)	19,804.91	14,229.13	9,227.67	6,654.42	3,610.18
ROA (%)*	20.73	25.03	20.33	16.99	12.80
ROE (%)*	39.28	32.01	24.67	23.66	16.56
Net Profit Margin (%)	31.83	20.60	16.24	16.87	10.17

* - Annualized

** - Calculated from the consolidated statement

For further information about Operational Risk Minimisation, TPM, TPM³ or the 5 Level Milestone TPM³ Excellence Award, please contact Ross Kennedy – President CTPM Australasia on +61 2 4226 6184 or visit the CTPM web page at www.ctpm.org.au

Footnote:

TPM was originally referred to as Total Productive Maintenance by the Japanese who developed this advanced approach to reliability involving everyone, rather than just the maintenance and engineering people so as to support the Toyota Production Systems drive for one-piece flow and allow quality problems to be identified at the earliest possible time.

Over the years, to better reflect the true focus of TPM, the acronym has taken many forms such as:

Total Plant Management;
Total Productive Manufacturing;
Total Productive Mining; or
Total Process Management.

TPM³ is an enhanced Australasian version of TPM & Lean developed by CTPM recognising the unique attributes of our Australasian workplace culture and the critical role equipment reliability plays in operational performance especially in a Lean environment.

It is a Business Improvement strategy designed to minimise Operational Risk by engaging and developing the skills of the frontline workforce (operators and maintainers) so that they can identify equipment, process and quality problems at the earliest possible time and ensure their prompt rectification. This result, not only in a more stable plant operation but most importantly maximises capacity, minimises costs and creates a safe & productive workplace.