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Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
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TRIPLE BOTTOM LINE (TBL) DEMONSTRATION PROJECT IN SOUTH EAST ASIA (CONTRACT No 2001/266)

FINAL REPORT
IMPLEMENTATION OF THE TBL DEMONSTRATION PROJECT IN THAILAND

Prepared by
Pitsamai Eamsakulrat, Ph. D.
(Thai TBL National Expert)

NATIONAL SCIENCE AND TECHNOLOGY DEVELOPMENT AGENCY (NSTDA)

15 March 2002

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Executive Summary

Implementation of UNIDO's Triple Bottom Line (TBL) demonstration project in Thailand was launched in September 2001, and ended in March 2002. The National Science and Technology Development Agency (NSTDA) was the implementing agency of the project in Thailand.

The TBL project in Thailand is part of UNIDO TBL demonstration project which aims to assist local small to medium sized exporters in improving their TBL performance on a continuing basis. Demonstration project results will be presented at the World Summit, Rio +10 in Johannesburg, South Africa around September 2002.

The project started with UNIDO TBL experts training the Thai TBL team. Five textile/clothing and furniture companies participated in the demonstration project. The Memorandum of Understanding (MOU) between NSTDA and the companies was signed on October 12, 2001.

The implementation steps were Gap analysis, In-house training, Action plan preparation or Brainstorming, Follow-up and Conclusion. Two Executive Meetings and two National Seminars were organized to share and disseminate the experiences among stakeholders: industrialists, government authorities and non-government organizations. At the second Executive Meeting, the Thai TBL slogan " Help reduce waste a little bit so that the economy will survive, the environment will be fine, and Thai society will develop. Increase morale and spirit, and Thai business will be sustained " was established as a driver of the project.

Each company formed a TBL team. It was crucial that each firm had the ability to make the TBL improvement process sustainable in its own company. Each team consisted of members from most functional areas. In general, top management acts as advisors to the TBL team. however, in this project , top Management of four of the five companies led the teams by themselves.

With assistance of The NSTDA TBL team, the company TBL teams undertook the TBL audits, using the Cleaner Production (CP) audit approach, i.e., focusing on inputs, outputs and waste of each operation. The audits covered not only production, safety, health and environment but also social issues. TBL options were subsequently generated in the brainstorming section of the; in-house training. The company TBL teams selected one or more options for implementation in two months. There were 15 options implemented in the project creating potential economic savings of at least THB 1.5 million / year or USD 34,884 / year. The potential Green House Gas reduction of Carbon dioxide was about 48 tons/year. Except for Company C, which has extensive experience in CP, And implemented a high cost option with about THB650,000 (USD 7,440) year/machine investment, the companies implemented no/low cost options.

The following tables summarize the options selected by the companies and the preliminary impacts on their respective bottom lines.

Table 1. Weaving company

Option selected	Impact
• Working practice improvement in yarn connection	• Reduced waste yarn up to 75% • Potential cost savings of THB 396,000[1] (USD 9,209) year with minimal implementation cost • Saved time • Increased productivity • Better working conditions

[1] THB 43 = USD

Table 2. Knitting company

Option selected	Impact
• Reduction of power consumption from a new elevator usage policy • Less frequent knitting machine setup • Better knitting machine maintenance	• Potential cost savings of THB 400,000(USD 9,302) year from a new elevator usage policy with no cost for implementation—just better planning. • Workers have more time to rest • Empowerment of teams • Reduction of waste fabrics • Reduction of waste oil • Increased productivity • Reduction of Green House Gases (CO2) by 48 metric tons/year

Table 3. Dyeing company

Option selected	Impact
• Closed-system jigger with indirect steam	• Potential cost savings of up to THB320,000 (USD 7,442) year/machine at an investment cost about THB650,000 (USD 15,116) /year/machine, about 2 year payback period • Reduced heat loss • Less steam contamination • Better working conditions • Reduced water consumption • Reduced wastewater treatment cost

Table 4. Apparel company

Option selected	Impacts
• Reducing worker turnover rate • Payment by objective and target	• Empowerment of teamwork • Higher production efficiency, e.g. productivity rose from 600 pieces/employee/month to 900 pieces/employee/month in February 2002 • Lower waste generation • Increased morale • Better working conditions • No cost for implementation

Table 5. Furniture company

Option selected	Impact
• New organization structure • Clearly defined reward and disciplinary policy • Formation of a preventive maintenance section • Information technology implementation in accounting, logging of working hours, product design and group ware communication channel.	• Cost savings from waste reduction (10.34% in August – December reduced to 5.2% in January – February) with no cost for implementation • Turned THB 1.2 million (USD27,906) waste accumulated in the company into value added products that sold for THB 350,000 (USD8,140) • More efficient resource utilization

Table 5. Furniture company (Cont.)

Option selected	Impact
• Competition to reduce waste in the whole factory • Clearly defined acceptable customer quality level • Value added products from waste • Dust collecting system improvement	• Increased morale and loyalty • Better working conditions • Better organizational communication • Better company image

In addition to the above options, the NSTDA TBL team requested all companies to implement Thai Morning Talk in order to increase communications within their firms. This enhanced their other option(s) and created happier working environments. One of the companies even claimed that this option helped reduce their rework from 18.6% to 8.04%.

The results from questionnaires showed that the company TBL teams were satisfied with the project. They also indicated that the TBL had helped them to potentially reduce operating costs, increase productivity and improve data organization, working conditions, working atmosphere and organizational communication. They also suggested that the results of the TBL project should be followed up since the five-month implementation period was limiting. The results at the end of the project were very promising, even though they were considered as preliminary and qualitative.

FINAL REPORT OF THE TRIPLE BOTTOM LINE DEMONSTRATION PROJECT IN THAILAND

1. Introduction

Thailand is a country covering 513,115 sq. km. in the Indochinese Peninsula of Southeast Asia, with a population of about 62 million.

The country is basically agricultural, but industrialized rapidly during the 1980s and early 1990s. Social and environmental problems have been increasing in urban areas, especially in the capital of Bangkok and its vicinity, where most major industries are located, including textiles and clothing, electronics, electrical goods, cement, petroleum refining, sugar refining, motor vehicles and parts, agricultural products, beverages, tobacco, metals and metal products, plastics and furniture.

When the Thai financial sector collapsed in mid-1997, after the managed float of the currency value, it started the country's most severe economic crisis affecting Thai industry as a whole. Thailand's WTO membership in 1995 worsened the situation, pressuring Thai industry to undergo major reorganization both at the micro and macro levels in order to survive.

In fact, the textile and clothing sectors, once the number one export industry of Thailand, have been restructuring for several years. Increasing competition from other developing countries with lower labour costs have pushed Thailand to seek a share in the upper market. This is inevitably driving firms towards higher technology and more efficient/effective management and manufacturing techniques.

Developed countries have potential demands of green products and social responsibility issues that the Thai industrialists consider them to be Non Tariff Barrier (NTB) on the upper export market.

The TBL demonstration project in the textiles and clothing sectors aims to prepare firms to cope with labour and environmental issues that they considered to be NTB for entering new markets or keeping existing markets in developed countries. It is timely since the suppliers from developing countries recognize that international buyers will exert more pressure and require more stringent practices from them in these issues sooner or later.

In addition, as mentioned earlier, Thai social structure is based upon agriculture. Evolving into an industrial society at such a rapid pace has been creating social and environmental stress, and the TBL demonstration project may be able to alleviate part of these pressures on companies.

In this project, four companies representing almost the whole spectrum of textiles and clothing sectors (apparel, dyeing, weaving and knitting) were selected. In addition, one wooden-furniture manufacturer was selected since the sector is a rising star for Thailand's industry.

2. Industries Selected for the TBL Project.

When the project was initially planned, UNIDO was interested in implementing the project only in the textile sector but there was one furniture manufacturer that wanted to participate in the project. The Thai TBL team and UNIDO discussed and agreed to have the company include in the project. The selection of the companies turned out to be a good combination in many aspects such as:

- Process variety – the selected companies have a wide range of activities ranging from highly labour intensive to process industry.
- All activities – selected companies in textiles represented by the most downstream company (apparel) to the most upstream company (weaving and knitting) with the dyeing company in the middle. This gave a good picture of the relationship among companies in the same sector.
- Organization structure variety – all companies are SMEs with different organization structures. Some have been established for up to forty years, others are start-ups.
- Geographical distribution – one company is located right in the center of Bangkok. Two companies are located in Samutprakarn province, which is the most industrialized area of Thailand. One company is located in Nakornprathom province, which is a residential area. One company is located in the Eastern Seaboard area of Rayong province, which is the emerging industrial area of Thailand.
- Of the 5 companies, three have been certified with ISO 9002. They have all used government support projects to improve marketing and productivity. All of them are aware of Cleaner Production (CP) but only two implemented CP in their factories. Two of them have experience in Code of Conducts and have been audited by the customers.

Even though the result obtained during the demonstration project may not be able to produce a concrete conclusion because diversity, we believe that this diversity will add some value to the project for future development.

Name and address of the selected companies are listed below:

1. Weaving company

Factory A: Thai Num Choke Textile Company Limited
99 Moo 2 Soi Bangmekao, Sukhumvit Road, Taiban,
Ampur Muang, Samutprakarn, 10280 THAILAND

2. Knitting company

Factory B: Thai Interknit Factory Company Limited
129/8 Soi Pongsirichai 1, Petchakasem Road, Omnoi
Krathumbaen, Samutsakorn 74130 THAILAND

3. Dyeing company

Factory C: Thanapaisal Registered Ordinary Partnership
218 Moo 1 Tumbol Bangpumai, Amphur Muang,
Samutprakarn THAILAND

4. Apparel company

Factory D: J.M. Apparel Company Limited
26/55 Nanglinchee Road, Tungmahamek, Sathorn
Bangkok 10120 THAILAND

5. Furniture company

Factory E: Postforming Industry (Thailand) Company Limited
Amata City Industrial Estate, Amphur Borwin, Rayong THAILAND

3. Methodology

The national TBL team leader, Dr. Pitsamai Eamsakulrat, was recruited in August 2001. UNIDO TBL experts trained the Thai TBL team between 3-4 September 2001. There were 25 agencies invited for the training, seven participated. For the introductory seminar of the TBL Demonstration project in Thailand on September 5, 2001, there were 218 agencies/companies invited, fourteen participated. This was because of the very new concept of TBL and a short notice. The UNIDO experts and Thai TBL team visited 2 companies on the 6 and 7 September 2001. During 12- 27 September 2001, the team leader solicited volunteer companies with the support from the Thailand Research Fund, the Federation of Thai Industries, the Textile Development Institute and the Association of Textile Dyeing and Printing and some individual industrialists.

By the end of September, there were 7 volunteer companies and 5 were selected of which 4 were in textile and clothing industry and one in furniture industry. Two of the selected ones were from the Introductory Seminar. They were all willing to pay THB 10,000 (USD233) as the commitment fee for participating in the project. The selected companies are all small and medium enterprises (less than 200 employee/equal or less than THB 200 million (USD 4.65 million) capital investment).

The first Executive Meeting of the companies on October 1, 2001. The team leader presented the TBL concept for the executive. The output expected at the end of the TBL Demonstration Project by the enterprises and the NSTDA TBL team was discussed. The results were that the Thai TBL Team (NSTDA and enterprises) would like to see more labor awareness and development, which will lead to less waste and more productivity. The working schedule for the project until March 2002 was discussed and identified. The TBL slogan competition was set for the second Executive Meeting in January 15, 2002.

On October 25, 2001, the NSTDA TBL team was trained in Labor Standards and Codes of Conduct by the social auditors of the Kenan Institute of Asia.

The implementation in each company started from a Gap Analysis, In-house Training, Action-Plan Preparation or Brainstorming, Follow-up and Conclusion, respectively. Details of each step are explained below.

Gap Analysis

Objective: To confirm general information given by the company in the application form and preassess the three bottom lines of the company.

Activities: During 3-13 October, NSTDA TBL team visited the companies for the Gap Analysis. The company TBL team explained the process of the company and had a dialogue with NSTDA TBL team. The TBL concept (financial, environment and social indices) was explained to the company TBL team. All participants walked through the premises from the receiving area of raw material to the shipping area of the final product focusing on production, environment, and social aspects. The training needs of the company were identified.

In-house Training

Objective: To train the company TBL Team on how to obtain the three indicators: financial, environmental and social. Translated audit checklist and worksheet in Thai were given to the company TBL team.

Activities: The companies had one-day In-house Training for TBL during 24 October – 6 November 2001. NSTDA requested to have 10 persons trained for each company so the total number of persons trained should be fifty. The companies requested that extra people be trained so a total of 69 people were trained. Four companies were trained to employ CP as a tool to minimize

waste. The exception was Thanapaisal, which had more than five years experience in CP. For Thanapaisal, the TBL team was requested to use CP to identify social issues in their factory. All of them received the training video " Clean Technology: Success through Unity" produced by the Federation of Thai Industries for further training their fellow workers. There were about 22 no/low cost options and one high cost option identified. The companies were requested to submit the TBL audit checklists to NSTDA by November 27, 2001.
Details of the training agenda are described below:
The training in the morning session: the financial indicators were introduced and explained. Criteria for selecting environmental indicators were then followed. Theories of social issue focusing on job satisfaction and job motivation were shown and explained to participants. Indicators for social issues were also introduced. CP was explained as a tool to implement TBL. Questionnaires regarding job satisfaction and worker morale were distributed to workers during lunch break.(Annex a)
For the afternoon session: CP concept and methodology were explained and wrapped up with the training video" Clean Technology: Success through Unity". The participants were then divided into 3 groups of five or more. All groups were asked to pre-assess the factory. The issues to be assessed were:
1) Waste, What is it? Where is it? When does it occur and how to prevent or reduce?
2) What should be the functional unit of the factory for the environmental indicator?
The company TBL teams were asked to carry on a detail audit and a feasibility study of the selected options themselves.

Action Plan Preparation or Brainstorming
Objective: To prepare the action plan for selected option(s).

Activities: The company had Brainstorming session during 6- 20 December 2001. The company team discussed and finalized the action plan for the selected option(s) with assistance from NSTDA TBL team. Details about activities, responsible persons, time-frame, budget and evaluation methods were prepared.

Follow-up
Objective: To monitor the progress of the action plan.

Activities: The companies had a follow-up session during 14 - 29 January 2002. NSTDA TBL team visited the company to determine the progress and discuss problems occurring during the implementation of the options. NSTDA TBL Team began the visit at 8 am to monitor the Thai Morning Talk option .

Conclusion
Objective: To summarize and record the achievement of the company in the demonstration project and to prepare draft presentation material for the national dissemination seminar on March 5, 2002.

Activities: The conclusion session took place during 14 - 25 February 2002. The company TBL team presented the achievements of the company. The company and NSTDA TBL team walked through the premises to see the improvement. The draft presentation materials for the dissemination seminar on the 5th of March 2002 were prepared utilizing the outline prepared by NSTDA. In addition, the questionnaires for TBL Demonstration Project Evaluation (Annex b) had been solicited from the company TBL team. The results were quantified and are shown in four charts in Section 9.

As a matter of fact, the overall project period was 7 months with the actual implementation period in 5 companies of 5 months. It was too short a period to complete process properly. Therefore, the results should be considered as preliminary and qualitative. If the demonstration project is continued, the result will be more concrete.

Figure 3-1 : Meeting and discussion between UNIDO expert, NSTDA TBL team and Company E TBL team during the Brainstorming session in the company on December 4, 2001.

Figure 3- 2 : Assessment to generate TBL options in Company D

The NSTDA TBL team consisted of eight persons including team leader. The team spent from 20- 28 man-days in each factory. The scheduled visits are shown in Table3-1.

Table 3-1: The factory visit schedule of NSTDA TBL team.

	Gap Analysis (10/01)					In-house (10-11/01)					Brainstorming (12/01)					Follow up (1/02)					Conclusion (2/02)				
Date	3	5	9	11	13	24	26	30	1	6	6	7	13	15	20	14	22	23	24	29	14	20	21	22	25
Factory A	X								X				X			X					X				
Factory B					X			X				X					X							X	
Factory C				X						X					X				X						X
Factory D		X					X							X						X		X			
Factory E			X			X					X							X						X		

In addition, NSTDA TBL team had requested all companies to have a competition for a Thai TBL slogan. The TBL slogan was to be solicited from workers in their factories. Each company then proposed a company slogan at the second Executive Meeting on 15 January 2002. Company B was selected be the company with the best slogan. So, the Thai TBL slogan is " Help reduce waste a little bit so that the economy will survive, the environment will be fine, and Thai society will develop. Increase morale and spirit, and Thai business will be sustained." All company slogans are in Annex c. The objective of the slogan competition was to evaluate whether the companies understand the TBL concept. The companies were also instructed to determine what their workers would expect as a reward if the came up with the winning slogan. The reason for this competition was to create a communication channel within the company by having the managerial level listen more to their worker's needs.

4. Basic data of Selected Companies

Table 4-1: Basic data of selected companies.

No.	Name of the factory	Nature of the Factory	Number of Employees	Product Manufactured	Output (per year)	Export percentage
A	Thai Num Choke Textile	Company Limited	140	Grey and dobby fabrics, Yarn dyed dobby fabrics, Industrial fabrics	4.2 mil yard	Indirect export around 60%
B	Thai Interknit Factory	Company Limited	103	Knit fabric	2.88 mil yard	90% indirect
C	Thanapaisal	Registered Ordinary Partnership	154	Dyed fabric (100% cotton), Dyed thread, Dyed silk, Handicraft fabric	12 mil yard	60 % indirect
D	J.M. Apparel	Company Limited	235	Knit wear	624,000 pcs	98% direct
E	Postforming Industry	Company Limited	80	Panel wood furniture 1. Do It Yourself (D.I.Y.) Furniture 2. Small Items 3. Mini-mart and convenience store shelf 4. Discount store checkout	240 containers[2]	60% direct

[2] The company was unable to submit other figure.

5. Financial Bottom Line

Information required for calculations of initial financial indicators was gathered and indicators were calculated according to the formulae provided. Some parameters needed for calculation were not familiar to the company. Therefore, the data collected in the table were based upon current data available in the factory, the period of data taken of each company were specified in the heading of the table. Indicators, especially pure financial measures and capital productivity, be compared since the time period was different i.e. month and year and different year. For the same month of November 2001, they were comparable, however, it was too short to be meaningful. Nevertheless, the companies understood the process and believed that they can work on them properly later on. REAP will be useful for them in this respect.

Table 5-1: Financial Indicators of selected companies

Financial Indicators	A (Nov2001)	B (Nov2001)	C (2000)	D (Nov2001)	E (2001)
1. Pure Financial Measures = Earnings Before Interest and Tax (EBIT) x 100 / Average capital employed over the year	11.49%	0.56 %	14.83%	474.35%	1,053%
2. Resource Productivity Measures **2.1. Overall Productivity Measures**					
a. Value added x 100 / Value of input	82%	50 %	100%	44%	103%
b. Value added x 100 / Value of Standard Output	-	33%	50%	38%	51%
c. Value added / Standard Output	11 Baht/kg	58 Baht/kg	616 Baht/yard	-	-
2.2. Labour Productivity Measures					
a. Value added / No. Employees	1,018 Baht/employee / month	64,489 Baht/employee / month	239,902 Baht/employee/year	208 Baht/employee /month	346,710 Baht/employee/year
b. Value added x 100 / Total wage bill	361.30%	1,708 %	240%	265.32%	534%

Financial Indicators	A (Nov2001)	B (Nov2001)	C (2000)	D (Nov2001)	E (2001)
2.3. Capital productivity = Value added x 100 / Average Capital Employed	24%	2 %	45.6%	183.36%	535%
2.4. Energy Productivity					
a. Value added / kWHr of Energy	36 Baht/kWHr	68 Baht/kWHr	179 Baht/kWHr	62 Baht/kWHr	204 Baht/kWHr
b. Value added x 100 / Total Energy Cost	1,445%	3,300 %	233%	2,835%	9,260%
3. Resource utilisation measures **3.1 Plant Utilization**					
a. Average % Utilisation under current operating conditions	70%	40 %	-	133%	89%
b. Average % utilisation of plant compared to technical maxima	43%	50 %	85%	32%	75%
3.2. Labour force utilisation					
a. Worker days lost x 100 / Total Days worked	11%	3 %	2%	80%	8%
b. Overtime hours x 100 / Total hours worked	2%	21 %	34%	25%	12%
3.3. Shift Work Pattern					
a. No. of Shifts worked	2 shifts	2 shifts	1 shift	1 shift	1 shift
b. Basic shift length	8 hrs	12 hrs	8 hrs	8 hrs	8 hrs
c. Overtime worked	none	Included in 12 hr	7	2.5 hrs	4 hrs

Financial Indicators	A (Nov2001)	B (Nov2001)	C (2000)	D (Nov2001)	E (2001)
4. Resource stability or turnover measure					
4.1 Labour force stability					
a. Labour turnover rate =No of workers leavening during the period / Average number of employees for the same period	38%	5 %	38%	57%	79%
b. Labour retention rate = No of workers who started the period present at the end/ Average No of employees for the same peirod	66%	94 %	61%	15%	37%
4.2. Stock (Inventory) turnover					
No of times / pa	9	1	25	-	4.7
4.3. Average of capital equipment					
Age in Years	15	12	22	6	10
5. General Effectiveness Measures					
5.1 Delivery Schedule Achievement					
=No. Planned Deliveries –(No. Late Deliveries + No. Part Deliveries)/ No. Planned Deliveries	0.50	1	-	0.90	-
5.2 Not Right First Time					
= Quantity of Defective Units x 100 / Total Quantity of Units Supplied	0.5%	0.9 %	-	3%	-

6. Social Bottom Line

Social issues are one of the "Triple Bottom Line" that are difficult to realize quantitative improvement, especially in a short time because social issues are related to human activity. It is necessary to require more time for a real change. The qualitative description is presented here. All companies were in compliance with the Thai Laws and about 5- 6 TBL social indicators. We recommended the improvement procedure for the non- compliance indicators.

Table 6-1: Social issues of selected companies

Social issues	A	B	C	D	E
Hours of work	48 Hrs per week	48 Hrs per week	48 Hrs per week	48 Hrs per week	48 hrs per week
Assessment	The maximum is 84 hrs per week (+Overtime) Overtime is paid at 1.5 time the wage	The maximum is 84 hrs per week (+Overtime) Overtime is paid at 1.5 time the wage	The maximum is 84 hrs per week (+Overtime) Overtime is paid at 1.5 time the wage	The maximum is 148 hrs per week (+Overtime) Overtime is paid at 1.5 time the wage	The maximum is 84 hrs per week (+Overtime) Overtime is paid at 1.5 time the wage
Compensation and Benefits	Wages are higher than the minimum wage	Wages are higher than the minimum wage	Wages are higher than the minimum wage	Wages are higher than the minimum wage	Wages are higher than the minimum wage
Assessment	13 day annual leave clean drinking water, bathroom, uniform Social Security Fund Free rice/3 meal per day	13 day annual leave clean drinking water, bathroom, uniform Social Security Fund	13 day annual leave clean drinking water, bathroom, uniform Social Security Fund Free rice/3 meal per day Bonus for non absent	13 day annual leave clean drinking water, bathroom Social Security Fund Bonus for non absent	13 day annual leave clean drinking water, bathroom, uniform Social Security Fund Bonus, vehicle pay Bonus for non absent
Freedom of Association	No union	Welfare Committee	Welfare Committee	Employee Committee	No union
Safety Policy & Organisation	a safety policy and personal responsible	a safety policy and personal responsible	a safety policy and personal responsible	a safety policy and personal responsible	a safety policy and personal responsible

Social issues	A	B	C	D	E
Health & Safety Issues	Risky noise, Work area is congested	Risky dust	Humidity and high temperature	Work area is congested.	Risky dust
Harassment and Abuse	Freedom from harassment is not mentioned	Freedom from harassment is guaranteed	Freedom from harassment is not mentioned	Freedom from harassment is not mentioned	Freedom from harassment is guaranteed
Assessment	Employees are free to complain against any harassment	Employees are free to complain against any harassment	Employees are free to complain against any harassment	Employees are free to complain against any harassment	Employees are free to complain against any harassment
Discrimination	No discrimination	No discrimination	No discrimination	No discrimination	No discrimination
Use of Child Labour	No child labour	No child labour	No child labour	No child labour	No child labour
Use of forced/bonded labour	No forced /bonded labour	No forced /bonded labour	No forced /bonded labour	No forced /bonded labour	No forced /bonded labour

7. Environmental Bottom line

The Environmental bottom line is one of the areas that is difficult to be quantified in a short time frame and with limited resources. The discharged wastewater effluents and air emissions from boilers were well within the standards according to company records. The qualitative description is presented here. Only one company has wastewater and it has proper a wastewater treatment system. All of them have air pollution problems. Thailand is under-equipped to properly handle air pollution problems in terms of knowledge and technical equipment. The air sampling is very expensive and some companies need to send samples overseas for analysis.

Table 7-1: Environmental issues of selected companies

Pollutants	A	B	C	D	E
Air Emissions and Noise	Lint and sizing material dust High noise level in weaving room	Lint and sizing material dust High noise level outside induced draft fan room and compressed air room	Particulate and emission from saw dust boiler Excessive heat in drying section Caustics contact High noise level near caustics recovery section	Lint and sizing material dust Moderate heat level in sewing area	Saw dust diffusion during emptying and removing the saw dust bags Evaporation of coating material High noise level in cutting section
Solid Waste and Industrial Waste	Thread and dirty fabric Spent lubricant	Dirty fabric Off-spec fabric Re-dyeing fabric Knitting needles	Re-dyeing fabric Spent chemicals Chemical containers	Small piece of fabric	Off spec product Saw dust Chemicals containers
Effluent	Not applicable	Not applicable	High COD effluent containing dyes and chemicals are treated in the company wastewater treatment plant before discharging into sewer	Not applicable	Not applicable

8. Brainstorming Session

A Brainstorming session was conducted in each company during the In-house Training. From the sessions, all possible options coming up were noted down without criticizing or removing any of them. There were 23 options proposed from these pre-assessments. We called these possible TBL options. The company then selected only one or more options to start implementing during the demonstration project period. Action plan and impacts on three bottom lines of this selected option were identified and quantified wherever possible. The criteria for option selection were that they were simple and easy to implement with clear results in the short time frame of the project. Moreover, it should significant have impacts the three bottom lines. There were 15 options implemented in the project with the potential economic savings of at least THB 1.5 million / USD 34,884/year. The potential Green House Gas reduction of Carbon dioxide was about 48 tons/year. Except for Company C, which has extensive experienced in CP and implemented a high cost option with about THB650, 000/ USD 7,440 /year/machine investment, the companies implemented no/low cost options. This session presents the selected option(s) and results for each company, whereas company background on the production process and all possible options generated are listed in Annex d – h.

Table 8-1 :Weaving Company Selected Option (Company A)

Option selected	Impact
• Working practice improvement in yarn connection	• Reduced waste yarn up to 75% • Potential cost savings of THB 396,000/USD 9,209 /year with minimal implementation cost • Saved time • Increased productivity • Better working conditions

Table 8-2 : Knitting Company Selected Options (Company B)

Option selected	Impact
• Reduction of power consumption from a new elevator usage policy • Less frequent knitting machine setup • Better knitting machine maintenance	• Potential cost savings of THB 400,000/USD 9,302 /year from a new elevator usage policy with no cost for implementation—just better planning. • Workers have more time to rest • Empowerment of teams • Reduction of waste fabrics • Reduction of waste oil • Increased productivity • Reduction of Green House Gases (CO2) by 48 metric tons/year

Table 8-3 : Dyeing Company Selected Option (Company C)

Option selected	Impact
• Closed-system jigger with indirect steam	• Potential cost savings of up to THB320,000 USD 7,442 year/machine at an investment cost about THB650,000/USD 15,116/year/machine, about 2 year payback period • Reduced heat loss • Less steam contamination • Better working conditions • Reduced water consumption • Reduced wastewater treatment cost

Table 8-4 : Apparel Company Selected Options (Company D)

Option selected	Impacts
• Reducing worker turnover rate • Payment by objective and target	• Empowerment of teamwork • Higher production efficiency, e.g. productivity rose from 600 pieces/employee/month to 900 pieces/employee/month in February 2002 • Lower waste generation • Increased morale • Better working conditions • No cost for implementation

Table 8-5 : Furniture Company Selected Options (Company E)

Option selected	Impact
• New organization structure • Clearly defined reward and disciplinary policy • Formation of a preventive maintenance section • Information technology implementation in accounting, logging of working hours, product design and group ware communication channel. • Competition to reduce waste in the whole factory • Clearly defined acceptable customer quality level • Value added products from waste • Dust collecting system improvement	• Cost savings from waste reduction (10.34% in August – December reduced to 5.2% in January – February) with no cost for implementation • Turned THB 1.2 million/USD 27,906 waste accumulated in the company into value added products that sold for THB 350,000/USD8,140 • More efficient resource utilization • Increased morale and royalty • Better working conditions • Better organizational communication • Better company image

For example, there was one concrete result of the TBL Demonstration Project benefits involving the furniture factory. During the In-house Training, the pre-assessment exercise showed that there was a lot of wasted raw material accumulated on the shop floor. This waste could be turned into valued-added products as a result a good teamwork between Rayong and Bangkok offices: production sections and design and marketing section. The company successfully implemented this option and could sell new product made from this waste for THB 350,000 or USD 8,140.

9. Conclusion Session

The participation of all five companies began from the decision of the top management, however, the benefits of TBL have impacts not only on the top management, which in this case are the owners of SMEs, but also the worker welfare and environment. To evaluate the real benefits of implementing TBL, especially on social issues, takes time. However, some remarkable points from each company opinions are worth mentioning here and being outlined and summarized as the results of the Conclusion session which were presented at the National Dissemination Seminar on the 5 March 2002 as follows:

9.1. Weaving company

Factory A: Thai Num Choke Textile Company Limited

The company stated the reasons for joining the TBL demonstration project as follows:
1. To be able to view the company performance in three dimensions.
2. To be able to cope with international standards.
3. To have organizational capacity building.
4. To prepare for international trade.

Question: How TBL demonstration project had an impact on company financial issues?
Answer:
1. Indicate efficiency of the company resources utilization.
2. Find out that existing accounting system did not facilitate the analysis and assessment of resources utilization.
3. Find out that inventory control was the major problem of the company.

Question: How TBL demonstration project had an impact on company environmental issue?
Answer:
1. The company has experience in CP. The environmental issue in CP has amplified and expanded to social issues.

Question: How TBL demonstration project had an impact on company social issues?
Answer:
1. Create worker committee on compensation and benefit issues according to Thai law.
2. Help company to document policy to cover more on the issue of discrimination, harassment and abuse and child labour.

The company also provided the following comments:
1. More skill and practice was needed to assess and analyze information obtained in the project.
2. TBL Demonstration Project helped the company to implement systematic data collection.
3. Better cooperation among sections was a success factor.

9.2. Knitting company

Factory B: Thai Interknit Factory Company Limited

The company stated the reasons for joining the TBL demonstration project as follows:
1. To prepare its human resources and obtain technical tools to cope with NTB.
2. To create happier and safer working conditions.
3. To increase production efficiency and reduce waste.

Question: How TBL demonstration project had an impact on company financial issues?
Answer:
1. Know resource utilization efficiency of the company.

2. Know strong and weak points of the company.
3. Lead to benchmarking.

Question: How TBL demonstration project had an impact on company environmental issues?
Answer:
1. Know how to conduct CP audit in order to reduce waste and production cost.

Question: How TBL demonstration project had an impact on company social issues?
Answer:
1. Revise lunch break from 0.5 hour to 1 hour.
2. Improve labour relationship and provide ways for workers to have more participation.

The company also provided the following comments:
1. TBL identified the needed data.
2. TBL helped the company to begin to have systematic data collection.
3. Longer demonstration project would be helpful.
4. Routine duties made staff participation limited.
5. Provision of a responsible person for the project would be of great advantage.

9.3. Dyeing company

Factory C: Thanapaisal R.O.P.

The company stated the reasons for joining the TBL demonstration project as follows:
1. To learn more about international standards via TBL.
2. To benchmark the company.
3. To learn more about process to improve company operation.
4. To learn how to develop the organization to meet the international standard.

Question: How TBL demonstration project had an impact on company financial issues?
Answer:
1. Made it possible to know strong point and weak point of the company.
2. Made it possible to prioritize the problems.

Question: How TBL demonstration project had an impact on company environmental issues?
Answer:
1. Know the suitable functional unit of the company i.e. kg of fabric.
2. Have a better benchmark.

Question: How TBL demonstration project had an impact on company social issues?
Answer:
1. Improvement of company policy regarding social issues.
2. More participation and feed back from employees.
3. Set up workers committee on compensation and benefit according to Thai law.

The company also provided the following comments:
1. TBL identified the needed data but the project time was too short to collect.
2. TBL helped the company to begin to have systematic data collection.
3. Longer demonstration project would be helpful.

9.4. Apparel company

Factory D: J.M. Apparel Company Limited

The company stated the reasons for joining the TBL demonstration project as follows:
1. To prepare the company to meet minimum international customers' requirement on social and environmental issues.
2. To reduce production cost.
3. To promote better relationships in the organization.
4. To increase productivity.

Question: How TBL demonstration project had an impact on company financial issues?
Answer:
1. Provide broader perspective on standard accounting procedures.
2. Know the necessary information was missing.

Question: How TBL demonstration project had an impact on company environmental issues?
Answer:
1. Realize the relationship between environment and people.
2. Understand CP and have more participation in waste minimization.

Question: How TBL demonstration project had an impact on company social issues?
Answer:
1. Assist company to cope with customers' requirement.
2. Serve as a fundamental principle for a happy working condition.
3. Create harmonious organization.

The company has experimented with the NSTDA proposed concept of no overtime with the same earning managed by the target out put – number of pieces sewn. They reported that, as the result of the Thai Morning Talk, which creates teamwork spirit, the Team could have 50 % more productivity than the target. They could sew 900 for the target of 600 pieces.
The company also provided the following comments:
1. Too high a workload for company staff made it difficult to work more on TBL.
2. Systematic data collecting would facilitate the TBL process.
3. Needed more skill in data collection and analysis.
4. Communication throughout the organization was an important success factor.
5. Longer demonstration project would be helpful.

9.5. Furniture company

Factory E: Postforming Industry Company Limited

The company stated the reasons for joining the TBL demonstration project as follows:
1. To find simple way for improvement of company operation.
2. To develop company human resources.
3. To enhance company competitiveness in export market.

Question: How TBL demonstration project had an impact on company financial issues?
Answer:
1. Know the resources utilization efficiency.
2. Lead to better use of accounting data.
3. Lead to better inventory control.
4. Can manage human resource more efficiently.
5. Lead to better policy formulation.

Question: How TBL demonstration project had an impact on company environmental issues?

Answer:
1. Know the amount of production loss through CP.
2. Develop procedure to have value added to waste.
3. Reduce waste handling cost.
4. Better working environment by reducing air pollution at the source.

Question: How TBL demonstration project had an impact on company social issues?
Answer:
1. Have better benefits for workers.
2. Improve morale and teamwork.
3. Create better working atmosphere and environment.
4. Create good staff attitude toward company.
5. Create good image for the company.

The company also provided the following comments:

1. Scattering of their data made it very difficult and time consuming to get financial indicators.
2. Communication throughout the organization was necessary in order to get more cooperation.

Since the auditing results of all the participating factories showed the common problem of lack of good communication channels in the factories. NSTDA TBL expert considered that this problem may be solved with the " Sa Wad Dee Taun Chao or Thai Morning Talk". The "Thai Morning Talk" is the combination of the Thai-Buddhist life style and the Japanese Morning Talk concept. The former is the Thai way of living: to think and act positively especially in the morning. Thais believe that if they begin the day with good things such as a humble "Wai" or " Sa Wad Dee" or a smile or speak good words extend loving and kindness to each others, etc., we will have good things happen for the rest of the day. The latter concept is one of the Japanese TQM components and has been accepted as a way to enhance quality through good teamwork spirit and is practiced by several large companies in Thailand. Therefore, the common option of " Sa Wad Dee Taun Chao" or "Thai Morning Talk" was proposed to the companies as a Thai TBL option. The TBL Expert Team has requested all participating factories to experiment with this option. Figure 9-1 shows this option at Company B.

The results from the Conclusion Session indicated that this option has enhanced their other option(s) and created a happier working environment for the companies. One of the companies even claimed that this option has reduced their rework from 18.6% to 8.04%.

Although the implementation time of the project was limited, the participating companies were satisfied with the overall results as quantified by the evaluation questionnaire (details in Annex b). Figures 9-2 – 9-5 shows the highlighted results of the project evaluation questionnaires. The results suggest the trend that the satisfaction of the companies increased with project time. The companies indicated that the one-day In-house training was too short to be effective. They enjoyed the results and expect to see the project continue. The company that did not implement the " Thai Morning Talk" had no confidence in the future of the project compared to the companies that did. The majority of them were reluctant to disseminate the results.

Figure 9-2 Companies' satisfaction of the Project and suggestions for the future.

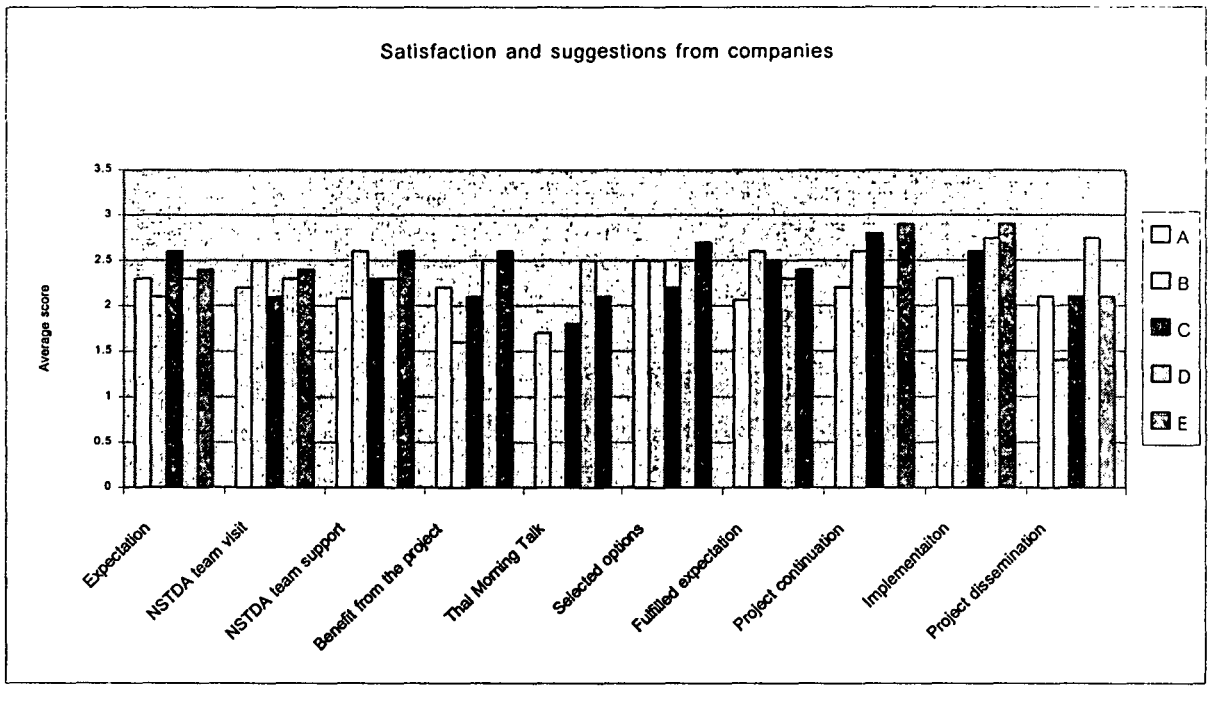


Figure 9-3 :Companies' opinions on the benefit from NSTDA team visit at each step

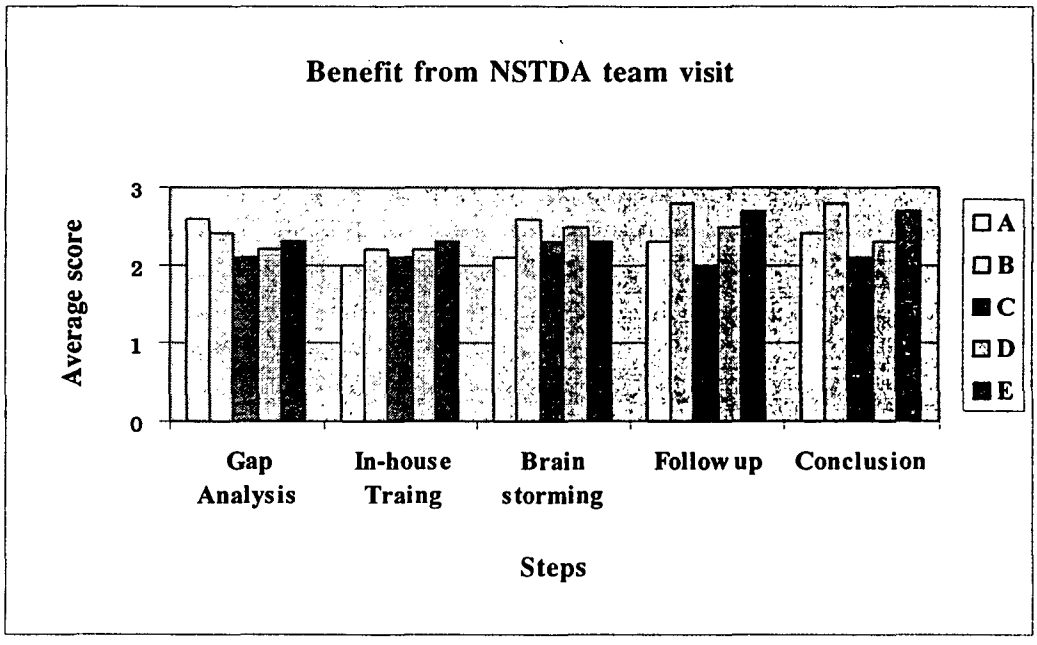


Figure 9-4 : Companies' opinions on the impacts from selected option(s) on the three bottom lines

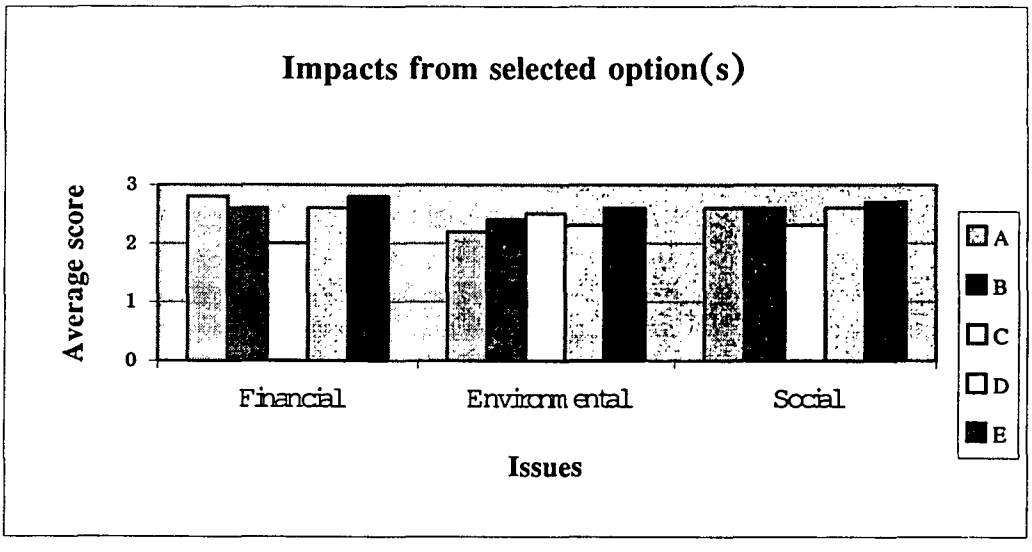
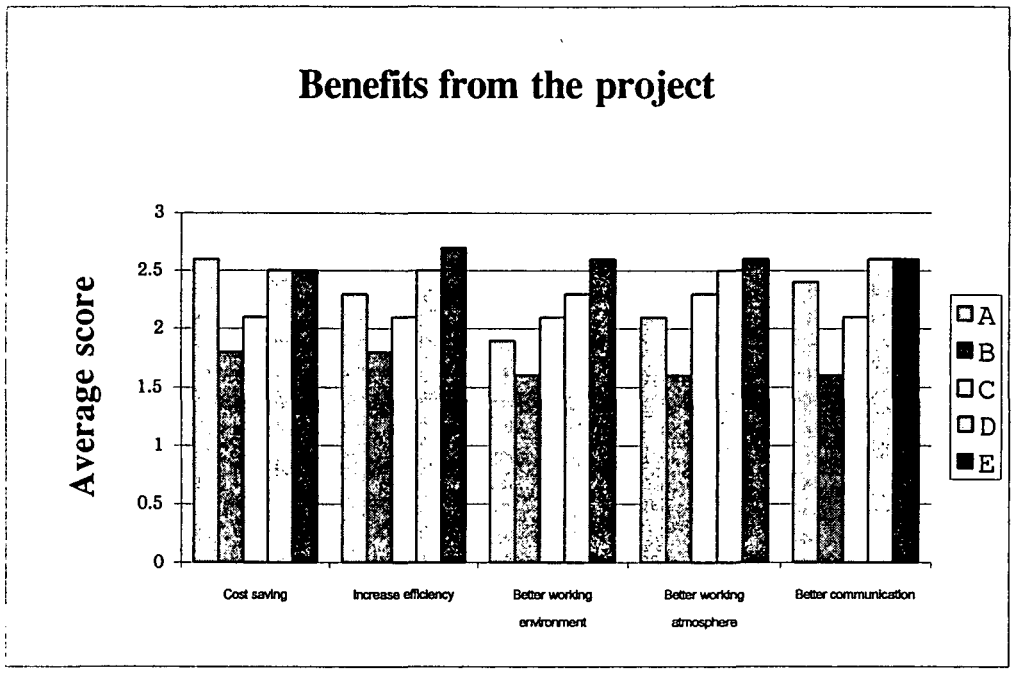


Figure 9-5 : Companies' opinions on the benefits from the project from various aspects.



10. Lessons Learnt

This section will elaborate on the lesson learnt from the TBL Demonstration Project in Thailand, which had an the implementation period from September 2001 – February 2002. Even though implementation time of the Project was limited, the participating companies were satisfied with the overall results and expected that the project should be continue to at least six more months to confirm the results. There were 15 options implemented in the project with potential economic savings of at least THB 1.5 million / USD 34,884/year. The potential Green House Gas reduction of Carbon dioxide was about 48 tons/year. Except for Company C, which has extensive experience in CP and implemented high cost option with about THB650, 000/ USD 7,440 /year/machine investment, the companies implemented no/low cost options. Other lessons learnt from the project can be concluded as follows:

1. TBL is an excellent initiative of UNIDO to prepare entrepreneurs in developing countries for competition in the world market.
2. So far, TBL has proved to be a tool for sustainable industrial development.
3. TBL results are preliminary and will depend upon the company culture.
4. CP can be extended to be a tool for TBL.
5. All companies have learned TBL. The experienced CP implementer can add social dimension to become TBL more easily than the inexperienced ones. All of them can potentially obtain the same benefits of TBL by the end of the project.
6. All the selected companies appreciate TBL, which can help to reduce their waste and create a better working environment and social conditions.
7. The keys to success of TBL are the same as CP: top management commitment and staff participation.
8. UN; Initiative should continue beyond demonstration projects.
9. TBL can be expected to be a countermeasure to NTB if it is developed into an international standard.

Table 10-1 The Pros and Cons from a Thai perspective

Pros	Cons
1. TBL success depends on the local culture so that it can be a locally made standard not an imported one from different cultures and backgrounds. 2. TBL International Standard from UNIDO initiative will be an international standard from developing countries for developing countries. 3. TBL International Standard will facilitate sustainable industrial development from developing countries by enhanced productivity, better compliance to social and environmental international standards.	1. TBL International Standard will add to the many already existing ones. 2. TBL International Standard needs a lot of acceptance and cooperation from several agencies both national and international. 3. Developed countries may not support the ideas since it will compete with their already existing standards.

10. TBL International Standard should be considered the same as Responsible Care Initiative that is voluntary initiative from private sector and internationally accepted. So, in our opinion, the continuous effort from TBL expert (Rodney Stares) to solicit support from MNC is the correct apporach. Since it is UNIDO initiative, it will facilitate the continuity of the process greatly if UNIDO has strong support for TBL.

11. The UNIDO's methodology is reasonable except for the first national seminar, "Brainstorming", in the middle of the project. It is inappropriate as it caused confusion to the selected companies. since it was the brainstorming of the stakeholders. It would be more useful if it was at the beginning of the project
12. Executive Meeting was a good venue for SMEs to share working experiences in the project.
13. Diversity of the companies has enhanced the richness of the results since they are not competitors but can become business partners. In other words, there was more openness.

Working Team

Advisor	: Prof. Dr. Chachanat	Thebtaranonth	Vice President
	Dr. Supat	Poopaka	Assistant to The President of NSTDA

Working Team	: Dr. Ladawan	Krasachol	Project Manager
	Ms. Sineenat	Srisanan	Project Assistant Manager
	Dr. Pitsamai	Eamsakulrat	Expert Leader
	Mr. Surachai	Leewatananukul	Expert
	Ms. Benja	Jirapatarapimol	Expert
	Ms. Nungruthai	Jungate	Expert
	Ms. Benjaporn	Wachirasrisuntara	Expert

Annex a : Questionnaire on Job Satisfaction and Worker Morale

Department.....
Sex.....Age.....Status .....

Please check (X) in space where it is your opinion.

Yes < ---------- No

No	Description	5	4	3	2	1
1.	Your company knows that you are important and you can do the job successfully.					
2.	You're proud that you work in this company.					
3.	Worker wages are sufficient.					
4.	Your performances are evaluated fairly.					
5.	You feel that you will be able to advance without any obstacle.					
6.	You like everything in your company such as policy, management, location etc.					
7.	Your company satisfies your performance, personality, knowledge and skills.					
8.	Your wage is enough to earn a living.					
9.	Your job is a temporary. May be transferred to other position.					
10.	Your job is boring (repetitive).					
11.	You are able to recommend the improvement for the jobs you are dealing with.					
12.	You are qualified for your job.					
13.	If the quantity of your job can be reduced, you will able to work more efficiently.					
14.	You are often to be late, or sometimes you have to leave before closing time.					
15.	You like your job very much.					
16.	You never consider changing your job.					
17.	Your surroundings i.e. light, noise, ventilation, and etc. are in good condition to support your work.					
18.	You feel that the environment you are normally working in is risky.					
19.	Although there are some disagreements in your team, then can be resolved.					
20.	Everybody can work in a co-operative manner.					
21.	You are proud to work in this current surrounding.					
22.	You feel that no one can work with you.					
23.	Your performance is not satisfied when you work with others.					
24.	You have a good relationship with your colleagues or your team.					
25.	You may propose some comments in order to improve working in your team.					
26.	Your colleagues are willing to help you when you have some problems, even in personal matters.					
27.	You are satisfied with the working environment with your colleagues.					
28.	In case that you are working in a team, your team can be successful. You like in team.					
29.	Your working group has a good knowledge and skill, so that they can complete the job successfully.					

No.	Description	5	4	3	2	1
30.	All colleagues in your group can work together.					
31.	Your immediate boss is kind and would like to promote her subordinates to advance.					
32.	Everybody is considered to be promoted by merit depending on their responsibility and skill.					
33.	Your boss is able to advise you or give you some suggestions relevant to your jobs even in private.					
34.	Your heads, colleagues and subordinates think that you are proficient and have the ability to work.					
35.	Your boss always makes a reasonable judgement if he has to discipline his employees.					
36.	You feel that the persons in your company often quit, transfer or move to work in other companies.					
37.	Your boss acts responsible in his jobs.					
38.	Your colleagues and subordinates concentrate their work.					
39.	You feel that no one in this company hates you.					

Annex b Questionnaire for TBL Project Evaluation

Questions	Result			
	High	Moderate	Low	Other
1. Before joining the project, what was your expectation level in the following issues?				
- Saving cost				
- Increasing company efficiency				
- Reducing environmental problems				
- Development of staff and organization				
- Preparing to compete in world market				
- Increasing company competency				
2. How do you receive value from each NSTDA team visit during the implementation?				
- Gap Analysis				
- In-house Training				
- Brainstorming				
- Follow-up				
- Conclusion				
3. Appropriateness of NSTDA support of the following issues				
3.1 Program of each visit				
3.2 Instructor ability				
3.3 Documents				
3.4 Continuous follow-up				
3.5 Communication with company				
4 Benefits from the project on the following issues				
- Cost saving				
- Increased efficiency				
- Better working environment				
- Better working atmosphere				
- Better communication				
4.1 Benefit from Thai Morning Talk option				
- Morning greeting / speaking good words				
- Extending love and kindness to each others				
- A short conversation prior to work				
4.2 Positive impact from selected option(s) on the following issues				
- Financial aspect				
- Environmental aspect				
- Social aspect				
5. After project completion, how is the expectation fulfilled on the following issues?				
- Cost Saving				
- Increasing company efficiency				
- Reducing environmental problems				
- Development of staff and organization				
- Preparing to compete in world market				

Questions	Result			
	High	Moderate	Low	Other
- Increasing company competency				
7. Do you wish the project to continue				
8. Is it possible that you will continue the TBL project in your company?				
9. Is it possible that you will discuss TBL with other companies?				

10. Other comments

Annex c: TBL Slogans from five Selected Companies (Unedited translate from Thai)

Company A:
Unity as the way,
To create good quality products and human resources,
To reduce waste, cost, time and save energy.
This will make everything progress in our society.
and take good care of environment.

Company B:
Help reduce waste a little bit, Economy will survive.
Environment will be fine, Thai society will develop.
And increase morale and spirit, Thai business will sustain.

Company C:
Triple Bottom Lines will open up business opportunity.

Company D:
Working is the duty. Safety and Method should be understood.
Commit and unity will help us firmly progress.

Company E:
Quality with Ethics

Annex d: Thai Num Choke Textile Company Limited

Thai Num Choke Textile Company Limited is a part of Soon Hua Lee Textile Group, producing gray and yarn dyed dobby fabric. Thai Num Choke is the weaving site of the Group. It receives yarn from other companies in the group located in the same area.. They have an inter-relating administration system. The company was established in 1983. It has a current weaving capacity of 4.2 million yard per annum or 70% of the Group capacity. The turnover in 2000 was 150 million Baht. Total employees are around 140, 90 female employees and 50 male employees. The company has participated in various quality improvement programs, for instance, Value Engineering and TQM. They also have experience in CP with NSTDA Internship Program and currently are joining in Cleaner Production for Industrial Efficiency (CPIE) program for Samutprakarn province. The company has been certified in ISO 9002 since January 2000.

Figure d-1 : Process Flow diagram of Thai Num Choke Textile Company Limited

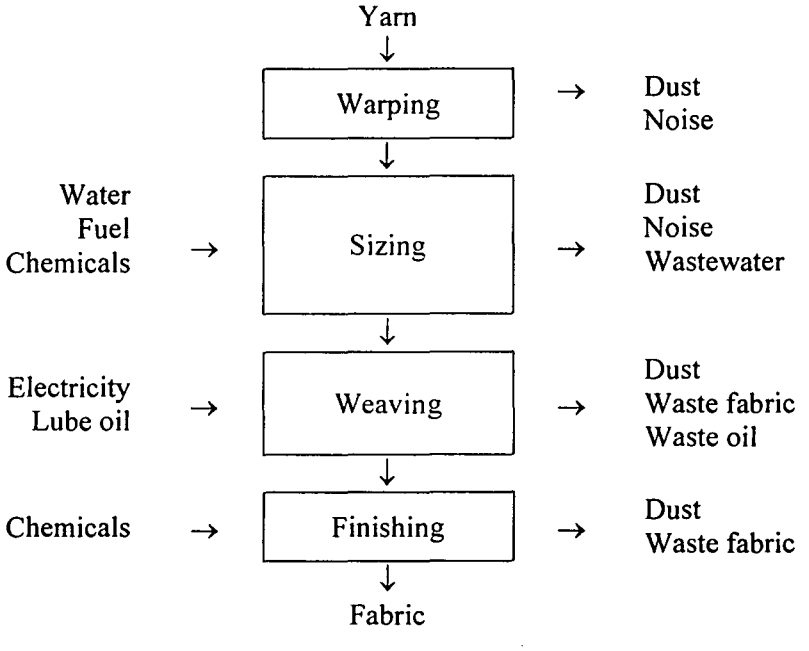


Table d-1: Possible TBL options generated

Unit operation	What?	Why?	How?
Storage	Moist / old yarn	Broken roof Long time storage	Repair roof Use First in – First out (FIFO) control
Warping	Tearing yarn Under-capacity	Rusty support ring No yarn	Preventive Maintenance Better procurement and production planning
Sizing	Yarn left over	Too long cover yarn	Reduce cover yarn from 5-6 yards to 4-5 yards
Boiler	Heat loss	No operating schedule	Planning with sizing section
Drawing-in	Waste yarn Waste paper scotch tape Waste time	Improper working practice Waste for yarn transportation	Making work instruction for using paper scotch tape Faster yarn

Unit operation	What?	Why?	How?
			transportation
Weaving	Waste fabric Waste edge yarn Lube oil High peak demand	Machine not working properly Improper machine setting Lube oil contaminated by dust Start up weaving machines at the same time	Improve working practice and use preventive maintenance Avoid oil contamination and reuse Use series start up
Quality control	Dirty fabric	Dust and lube oil	Proper handling
Maintenance	Oil stain on fabric	Leaking oil tube Too much lubrication	Preventive maintenance
Finish product storage	Waste fabric	Returned from customers	Find out why and improve Turn to second grade product

Annex e : Thai Interknit Factory Company Limited

Thai Interknit Factory Company Limited is a knitting company founded in 1990. The turnover in 2000 was 230 million Baht. Current knitting capacity is 3.6 million yards per annum. Total employees are 103. The company produces all kinds of knitting fabric of which around 90% is indirectly exported. The company has never experienced CP before, however, they have ISO 9002 certification since 2000.

Figure e-1: Flow diagram of Thai Interknit Factory Company Limited

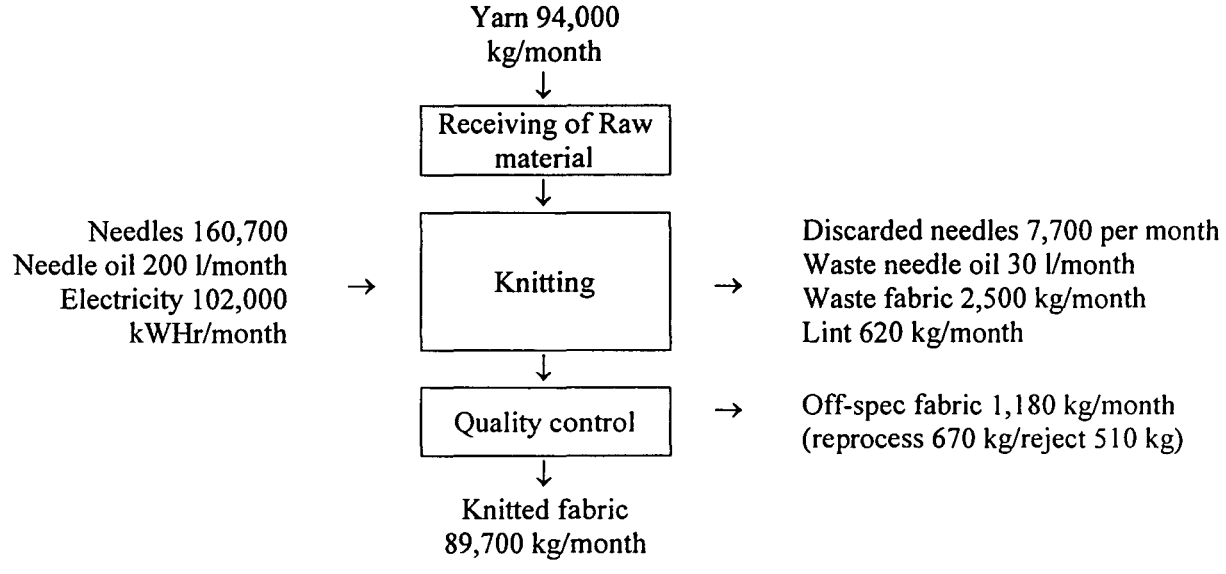


Table e-1: Possible TBL options generated

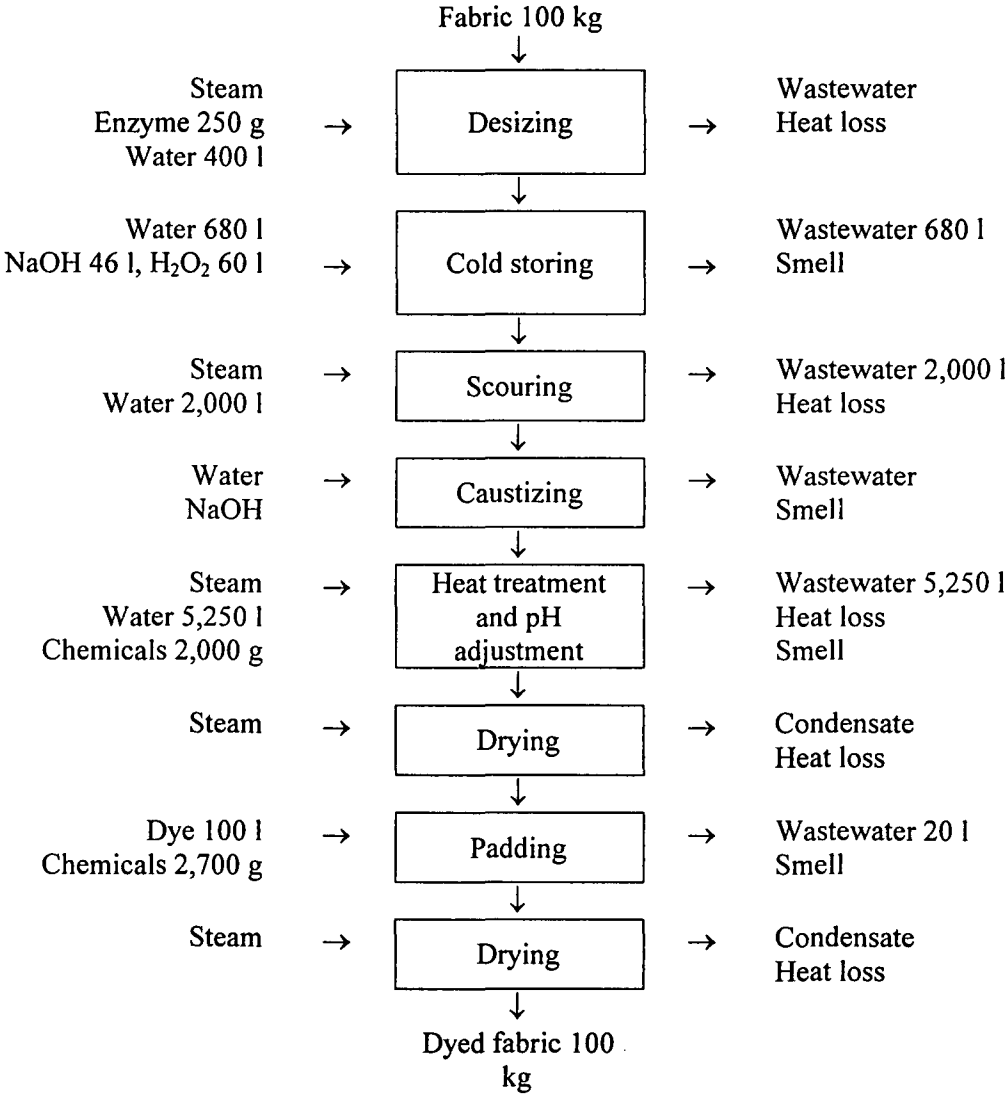
Unit operation	What?	Why?	How?
Raw material receiving	Thread (old, soft, deformed and dusty)	Poor storage	FIFO Proper storage Raise awareness
	Thread (non-uniform)	Suppliers	Check suppliers
Knitting	Loss of fabric during machine startup	Re-start machine	Careful monitoring
	Tearing thread	High tension	Careful monitoring
	Loss of needles	End of life Dust Broken	Careful monitoring Implement Preventive Maintenance
	Machine downtime	No order Change pattern Change needles	Get larger orders Have pattern database Operate machines correctly
	Poor quality fabric	Poor quality needles Poor quality thread	Check suppliers
Knitting fabric storage	Fabric mixed up	Poor labeling	Clearly label machine number and fabric number

Unit operation	What?	Why?	How?
Dyeing fabric storage	Off-spec product	Wrong shade Late delivery	Carefully plan and monitor internal and external process
Dust collecting system	Poor efficiency	Dust blocking in ducts	Operate the system correctly and implement Preventive Maintenance
Compressed air system	Air leakage	Poor housekeeping	Preventive Maintenance

Annex f : Thanapaisal Registered Ordinary Partnership

Thanapaisal R.O.P. was founded in 1961. It's main business is commission dyeing of cotton and other natural fabric. Current dyeing capacity is 9.6 million yards per annum. Total employees are 156, 120 male employees and 36 female employees. Thanapaisal has experience of CP and Environmental Management System for 10 years. They also have other quality improvement programs such as Five'S and Total Productive Maintenance.

Figure f-1: Flow diagram of Thanapaisal R.O.P.



Annex g: J.M. Apparel Company Limited

J.M. Apparel Company Limited was established in 1993. It produces all kinds of knitwear production and especially Polo shirts mainly for export markets. Its clients have brand names such as Nautica, Arrow, etc. Turnover in 2000 was 150 million Baht. Current capacity is 1.4 million pieces per annum. Total employees are 235, around 70% are contract employees. It is the first and only garment manufacturer in Thailand who has gained the certificate called "Thai Foundation Quality Standard System (TFQSS) in the mid of 1999. They also achieved ISO 9002 certification in 2000.

Figure g-1: Flow diagram of J.M. Apparel Company Limited

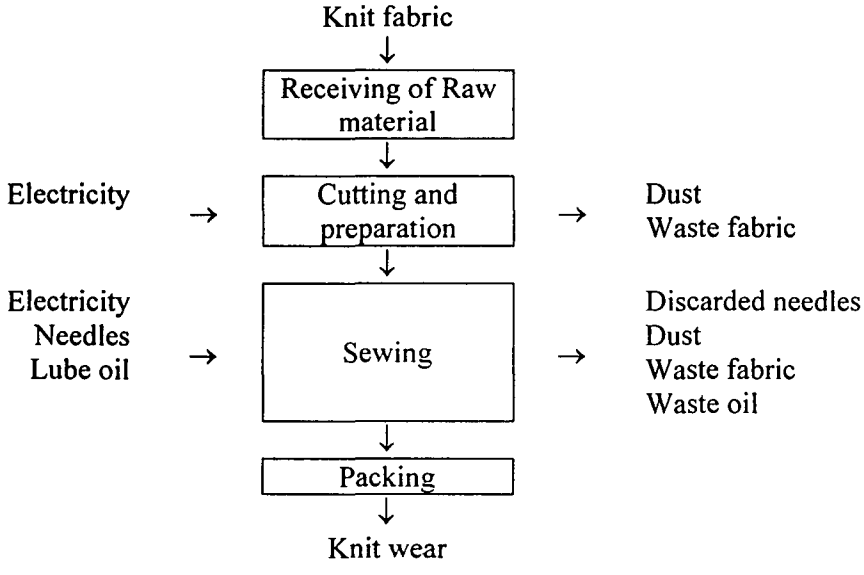


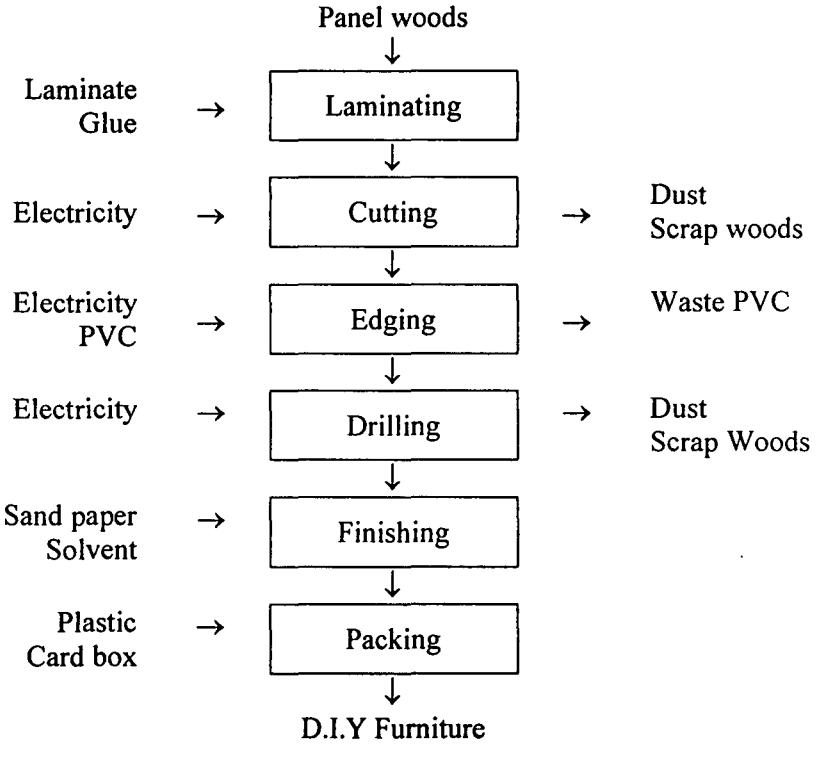
Table g-1: Possible TBL options generated

Unit operation	What?	Why?	How?
Raw material storage	Unused thread Unused fabric Other accessories	Over ordering	More accurate purchase order Create value-added product from waste
Sewing	Wrong use of needle Sewing machine Dust	Needle and fabric mismatched Machine breakdown Poor ventilation	Training and communication on working practice Preventive Maintenance Proper ventilation system installed

Annex h: Postforming Industry (Thailand) Company Limited

Postforming Industry Company Limited was founded in 1989, however It has just been relocated to its present facility in 2001. Its major products are Do-It-Yourself (D.I.Y) furniture, small items for export market (60%) and checkout counters for the domestic market (30%). Current capacity for export products is 240 containers per annum, this figure is due to increase significantly after the expansion of the factory. There are 80 persons employed in the facility, 50 male and 30 female.

Figure h-1: Flow diagram of Postforming (Thailand) Industry Company Limited



Possible TBL options

Results of the In-house Training of this company are not as thorough as other companies because more time had been allocated for explanation and answer to participant's questions that had limited training experience. Therefore, the time for group work was limited. The participants had pointed out the following issues:

1) Commitment from top management was very important.
2) Human resource problems, including training, motivation, communication etc.
3) Work practices and ergonomics were to be improved in order to relieve workers from fatigue, have improved efficiency.
4) Machinery and working area was very congested.
5) Waste in process was very high. For example, starting from 1 pallet (200 boards) in cutting section, there were 70 boards arriving at drilling section.

Annex i : Labour Laws Applicable to Industries and Business Enterprises in Thailand

There are numerous laws governing labor matters in Thailand;

1. Civil and Commercial Code " Hire of Services "
2. Labour Relations Act 1975
3. Act of Establishment of Labour Courts and Labor Court Procedure 1979
4. Provident Fund Act 1987
5. Social Security Act 1990
6. Compensation Fund Act 1994
7. Labour Protection Act 1998

Important features of the laws relating to Labor Protection Act are as follow:

General Provision

1. Security Deposit
2. Change of employer

Working Condition

1. Work Hours and Holidays
2. Rest Periods
3. Weekly Holidays
4. Traditional Holidays
5. Annual Holidays
6. Sick Leave
7. Maternity Leave
8. Military Leave

Remuneration

1. Minimum Wage
2. Overtime and Holiday Pay

Welfare and Workers Compensation

1. Working Conditions
2. Workers Compensation
3. Social Security Fund

General Provision

1.Security Deposit (Section 10)
Employer cannot request or receive a security deposit from employee, except for the employee who is responsible for money and property of the employer.
2.Change of employer (Section 13)
A change of employer for any reason, including of transfer of employment, shall not affect an employee's right by previous employer. The new employer has to accept all right and obligations of the previous employer.

Working Condition

1.Work Hours (Section 23)
The maximum work hours;

1. Hazardous work is 7 hours per day and not more than 42 hours per week.
2. Other types of work are 8 hours per day and not more than 48 hours per week.

2.Rest Periods (Section 27)

Employer must assign a 1-hour rest period after 5 consecutive working hours. It is permissible for employers and employees to agree to rest less than 1 hour per time but not less than 1 hour per day (have to rest more than 1 time per day).

3.Weekly Holidays (Section 28)

Employee is entitled at least one day of holiday per week and the interval between weekly holidays must not be more than six days. Any day may be agreed upon in advance as the weekly holiday.

4.Traditional Holidays (Section 29)

Employee is entitled to a minimum of 13 traditional holidays with pay per year, including the National Labor Day (May 1). The employer may select which traditional holidays will be recognized. When a traditional holiday falls on a weekly holiday it must be postponed to the following working day.

5.Annual Holidays (Section 30)

Employees who have worked for a continuous period of one year are entitled to an annual holiday of not less than six working days with pay per year. The annual holidays may, by mutual agreement, be accumulated and postponed to another year.

6. Sick Leave (Section 32 and 57)

Employee is entitled to sick leave for their illness actually incurred, but employer need not pay more than 30 days per year. Employer may require a medical certificate for 3 consecutive sick leaves or more.

7.Maternity Leave (Section 41)

Pregnant employee is entitled to 90 days maternity leave with pay of 45 days. With medical certificate that she is unable to work in the previous duty, she will be entitled to request to change her duty for temporarily before or after giving birth.

8.Military Leave (Section 35)

Male employee is entitled to leave for the purpose of military service in connection with call up for inspection, military training or testing for readiness under the law on military service with pay during the period of leave but not exceeding 60 days per year.

Remuneration

1. Minimum Wage

Presently the minimum wage ranges from Baht 165 per day in Bangkok and 6 other provinces (Nonthaburi, Pathumthani, Samutprakarn, Samutsakorn, Nakhonpathom and Phuket, Baht 143 in Ranong, Pang-Nga, Chonburi, Saraburi, Nakhon Ratchasima and Chiangmai and Baht 130 elsewhere.(except certain agricultural workers.and employee in such other occupations as the Minister may stipulate)

2. Overtime and Holiday Pay (Section 61, 62, 63)

Employee is entitled to payment rate;

- Overtime on normal working day is " one and a half time "
- Normal time for Holiday is
    - Increase a time rate for employees entitled to wages on holidays
    - Increase twice rate for employees not entitled to wages on holiday
- Overtime on Holiday is " triple time "

3. **Place of Payment of Wages and Salaries (Section 53,77)**

Under the Labor Protection Act, the employer must pay the wages or salary of an employee at the place of work unless the employee agrees to another place or method of payment.

Thus, an employer using automatic deposit into an employee's bank account must first obtain the permission of that employee. The employee cannot be compelled to accept payment in this fashion

Welfare and Workers Compensation

1. Working Condition

The employer is required to provide clean drinking water, bathrooms, first aid and medical facilities, and safe, sanitary working conditions sufficient to accommodate the employees.

2. Workers Compensation
Workers who are injured or become ill in the normal course of their employment are entitled to medical disability. If a worker dies, his or her family is entitled to death benefits. The amount of compensation is small compared to other countries.
Employers who regularly employ 10 or more employee is required to contribute to the Workers Compensation Fund. The amount depends on the type of business, ranging from 0.2 to 2 percent of the employees' annual wages, with a maximum wage base of Baht 240,000 per year.
3. Social Security Fund
Any employer of 10 or more people must also contribute to the Social Security Fund. The fund presently provides funds for the loss of wages as a result of childbirth, and non-work related injury, disability or death.
By 1996, the benefits will be expanded to include child welfare and retirement. Although presently not in force, unemployment benefits are also contained in the legislation.
4. **Welfare Committee**
An employer of 50 or more employees must form a welfare committee having at least five employee members. The employer must meet with the committee at least once every three months.

Working Rules

Employer with 10 or more employees must establish rules and regulations governing working conditions that must contain at least the following particulars:

1. Working days, normal working hours and recreation periods
2. Holidays and rule governing holidays and work stoppage
3. Rules on overtime work and work on holidays
4. Date and place where wages, overtime payment, holiday overtime payment will be paid.
5. Leaves of absence and rules governing the leaves
6. Discipline and disciplinary measures.
7. Petition.
8. Termination of employment, severance pay and special severance pay

The work rules must be in the Thai language.

Termination and Severance Pay

1. **Rate of Severance Pay** (Section 118)
An employee who has worked for a minimum of 120 days is entitled to severance pay for termination;

Work period	Severance Pay Rate
120 days – less than 1 year	30 days
1 year – less than 3 years	90 days
3 years – less than 6 years	180 days
6 years – less than 10 years	240 days
10 years and over	300 days

2. Non-entitlement of Severance Pay (Section 119)
Employer need not pay Severance Pay to employee who is terminated in any of following cases:

1. Dishonesty to duties or deliberate commission of crime against the employer
2. Intentionally causing damage to the employer
3. Negligence causing serious damage to the employer
4. Violation of work regulations or orders of the employer and employer had already issued a written warning, except that in serious cases the employer need not have issued a warning.

5. Desertion of duty for three consecutive working days without reasonable cause.
6. Being imprisoned under a final judgement ordering imprisonment, except it is a sentence for an offence which was committed out of negtligence or petty offence. If the parties have not fixed the duration of the employment, either party may terminate it by giving notice on or before the day prior to the final payday. No more than three months advance notice need be given, and the equivalent in salary may be paid in lieu of notice. Advance notice or pay in lieu is in addition to the severance pay requirements discussed above.

3.Special Severance Pay (Section 121, 122)

If an employer terminates an employee due to improvement in the organizational structure, manufacturing process, sale or service on account of use of new machinery, or change of machinery or technology, and in effect reduces the number of employees, the employer must notify the employee whose employment is to be terminated and the Labor Inspector at least 60 days in advance of the termination. The employer can also terminate the employment by paying the employee severance pay equivalent to the rate of the last 60 days' wages in lieu of notice. Additionally, if an employer, under these circumstances, terminates an employee who has worked for an unbroken period of at least six years, the employer is required to pay additional special severance pay. The additional special severance pay must be paid, in an amount not less than a sum equal to the last fifteen days' wages, for every full year of employment after the sixth year. According to the law, a period of more than 180 days is deemed to be a full year. The entire special severance pay shall not exceed a sum equal to the last 365 days wages.

Annex j: Major Laws Applicable to Factory Operation Relating to the Environment and Safety

There are many laws related to industries in regards to environment and safety. Here is the list of major Acts that companies need to be complied with.

1. Factory Act, 1992
2. Hazardous Substances Act, 1992
3. Groundwater Act, 1992
4. Industrial Estate Authority Act, 1992
5. Enhancement and conservation of national environmental quality Act, 1992
6. Energy Development and Promotion Act, 1992
7. Energy Conservation Promotion Act, 1992
8. Public Health Act, 1992
9. Navigation Act, 1992
10. Building control Act, 1979
11. Fuel Oil Act, 1987
12. Labour Protection Act, 1998

Under each Act, details are provided in Ministerial Rules, Notifications and Regulations, which are beyond the scope of this Annex. Details can be found in Royal Gazette. Or contact concerning government authority.

Annex k : Industrial Effluent Standards (General)

No.	Determinant	Tolerance Limit
1.	pH	5.5 – 9.0
2.	Total Dissolved Solids (TDS), mg/l	3,000 or Receiving water salinity + 5,000
3.	Suspended Solids (SS), mg/l	50
4.	Heavy metal, mg/l	
	Mercury	0.005
	Selenium	0.02
	Cadmium	0.03
	Lead	0.2
	Arsenic	0.25
	Hexavalent Chromium	0.25
	Trivalent Chromium	0.75
	Barium	1.0
	Nickel	1.0
	Copper	2.0
	Zinc	5.0
	Manganese	5.0
5.	Sulphide (H_2S equivalent), mg/l	1.0
6.	Cyanide (HCN equivalent), mg/l	0.2
7.	Formaldehyde, mg/l	1.0
8.	Phenol Compound , mg/l	1.0
9.	Free Chlorine, mg/l	1.0
10.	Pesticide	Not detectable
11.	Temperature, ° C	40
12.	Colour	Not offensive
13.	Odour	Not offensive
14.	Oil & Grease, mg/l	5
15.	Biochemical Oxygen Demand (BOD_5^{20}), mg/l	20
16.	Total Kjeldahl Nitrogen (TKN), mg/l	100
17.	Chemical Oxygen Demand (COD), mg/l	120

Annex I: Tolerance Limits for Effluents from Textile – Dyeing Industry Discharged into Surface Water

No.	Determinant	Tolerance Limit
1.	pH	5.5 – 9.0
2.	Total Dissolved Solids (TDS), mg/l	3,000
3.	Suspended Solids (SS), mg/l	50
4.	Heavy metal, mg/l	
	Mercury	0.005
	Selenium	0.02
	Cadmium	0.03
	Lead	0.2
	Arsenic	0.25
	Hexavalent Chromium	0.25
	Trivalent Chromium	0.75
	Barium	1.0
	Nickel	1.0
	Copper	2.0
	Zinc	5.0
	Manganese	5.0
5.	Sulphide (H_2S equivalent), mg/l	1.0
6.	Cyanide (HCN equivalent), mg/l	0.2
7.	Formaldehyde, mg/l	1.0
8.	Phenol Compound , mg/l	1.0
9.	Free Chlorine, mg/l	1.0
10.	Pesticide	Not detectable
11.	Temperature, ° C	40
12.	Colour	Not offensive
13.	Odour	Not offensive
14.	Oil & Grease, mg/l	5
15.	Biochemical Oxygen Demand (BOD_5^{20}), mg/l	60
16.	Total Kjeldahl Nitrogen (TKN), mg/l	100
17.	Chemical Oxygen Demand (COD), mg/l	400

Annex m : Worksheet for Financial Indicator Calculation

Year_____

	Unit	Data
1. Earning Before Interest and tax	Baht	
2. Average Capital Employed	Baht	
3. Total Value of Product	Baht	
4. Total Material Capital	Baht	
5. Total Energy Capital	Baht	
6. Value Added (3 – 4 – 5)	Baht	
7. No. of Products	Unit	
8. Total Hours Worked	Hours	
9. No. of Employees per full time equivalent	Persons	
10. Employee Capital	Baht	
11. Electrical Energy used	KW-Hour	
12. Fuel-other	Liters	
13. Time of Planned Production	Hours	
14. Time of Production	Hours	
15. Production Capacity	Unit	
16. Total Work Days Lost	Days	
17. Total Days Paid	Days	
18. Total Work Days	Days	
19. No. of workers leaving in this year	Persons	
20. No. of workers who started the year and present at the end of a year	Persons	
21. No. of workers at the beginning of a year	Persons	
22. No. of workers at the end of a year	Persons	
23. Average Value of products	Baht	
24. No. of planned deliveries	Unit	
25. No. of late deliveries	Unit	
26. No. of partial deliveries	Unit	
27. No. of defective products	Unit	
28. Product Cycle Time	Hours/Unit	