



A Case Study: Improving Business Operations at Wongpanit Donmuang Using Microsoft Excel

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Abstract

This paper presents a real IT project implemented at Wongpanit Donmuang by the author. This case study illustrates how Microsoft Excel solutions improve business operations at Wongpanit Donmuang. The company is in the business of buying and reselling non-hazardous recyclable products and scraps from walk-in customers and factories in Bangkok and other provinces nearby. The company has enjoyed a great business success over its 5-year operation. However, most daily business operations are conducted manually. The management foresees the need to use IT applications to improve its operation to keep up with its achievements and continual growth. Thus, the company decided to hire an independent consultant to improve its business operation. The consultant used Microsoft Excel to develop solutions to fulfill the IT needs of the company. These solutions cover critical business operations, including scrape separation process that utilizes bill of material concept, stock keeping application that incorporates financial capability, an accounting system that is capable of generating financial reports, and interactive management reports. In short, the focus of this paper is to present Microsoft Excel solutions that help the company to effectively improve its daily operations. This paper consists of three major parts: Part one highlight the company profile and basic structure of the company's business operations. Part two captures how these business operations are improved by Microsoft Excel solutions. Finally, part three discusses how the Microsoft Excel solutions benefit the company.

Key words: *Business operations, Microsoft Excel, Management, Achievements, Solution benefits*

COMPANY BACKGROUND

Wongpanit Donmuang is a smallsize company that buysand resells non-hazardous recyclable materials, scraps, and products from both households and factories in Bangkok and industrial parks in nearby provinces such as Ayutaya and Pathumtani. The company has enjoyed great business success over its 5-year operation. However, most daily business operations are conducted manually with limited use of IT. The management foresees the benefits of using IT applications to improve its operation to keep up with its accomplishments and continual growth.



Thus, the company decided to work with an independent consultant team to improve its business operation. The consultant used Microsoft Excel to develop solutions to fulfill the IT needs of the company. These solutions cover critical business operations, including scrap separation process, that utilize bill of material concepts, stock keeping applications that incorporate financial capability, an accounting system that is capable of generating financial reports, and interactive management reports. In brief, the focus of this paper is to present Microsoft Excel solutions that help the company to effectively improve its daily operations. This paper consists of four major parts: Part one highlights the company profile and how the company operates. Part two illustrates the company's operation processes. Part three demonstrates how business operations are improved using Microsoft Excel. Finally, part four discusses how the Microsoft Excel solutions benefit the company.

COMPANY PROFILE

Company Name	Wongpanit Donmuang
Business Type	Buy and resell non-hazardous recyclable materials, scraps, and products
Location	9 Terdrachun Rd., Tungseegun, Donmuang District, Bangkok 10210
Phone/Fax Number	08 1931 2546
Year of Establishment	2008
Registered Fund	1,000,000 baht
Channel of Distribution	Direct purchase from customers and direct sales to brokers
Total Sales in Year 2012	25 million baht
Current Sales	Approximately 2.25 million baht/month
Owner	Mr. Boonlert Sutheeduangsamon
Number of Employees	13 persons

OPERATION AT WONGPANIT DONMUANG



One of the key successes of buying recyclable materials, scraps, and products at Wongpanit Donmuangis “maximum price for pre-separation” policy. This simply means that customers who separate recyclable materials and scraps before they bring to sell them will get the highest price for each recyclable item (see figure 1). On the other hand, recyclable products such as motors, fans, and refrigerators will be disassembled into pieces to be sold as used parts or recyclable materials according to their category which in turn adds more value to the disassembled materials (see figure 2).

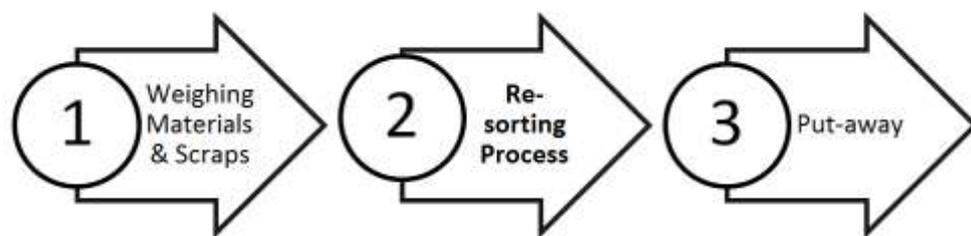


Figure 1: Materials and scraps process

Approximately 95% of materials and scraps are pre-sorted by customers. Therefore materials and scraps can be easily put in their sections to be resold to brokers later.

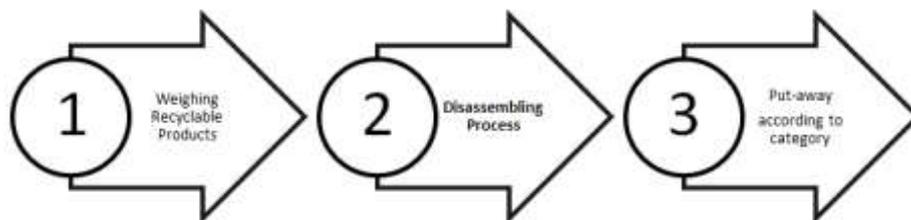


Figure 2: Recyclable process

Recyclable products that have been bought are disassembled every day. The challenges for the plant manager is to keep track of both the products and their disassemble materials. For example, a 14-inch fan can be disassembled into many pieces to be sold for different prices (see table 1).



Table 1: Disassembled materials from a 14-inch fan

No.	Item	Weight (Kg.)
1	Thick Iron	1.2
2	Copper # 4	0.2
3	Aluminum	0.2
4	Thin iron	1.3
5	Mixed plastic	0.2
6	Plastic	0.2
7	Plywood	0.2
8	Waste	0.1
Total		<u>3.6</u>

OBJECTIVES

The main focus of this project is to provide practical solutions for Wongpanit Donmuang's existing work processes so that the company's daily operations become more proficient. The following are the project's objectives.

- 1) Analyze current operations to identify key problem areas
- 2) Develop application tools
- 3) Generate interactive multi-level reports
- 4) Link models for information sharing

PROCEDURE

It is important that the solutions must fit the needs of both management and individuals working at the operation level. Therefore, study procedures are designed to integrate idea and work processes from management down to operational level to come up with a course of action that everyone involved is willing to commit to and support. The procedure is divided into three stages: 1) Problem identification, 2) Model development, and 3) Model integration and linkage (see figure 3). Once applications have been successfully developed and implemented, users must also be trained. Thus, screen capture is used to record lessons during the training sessions and they can also be used for future reference.

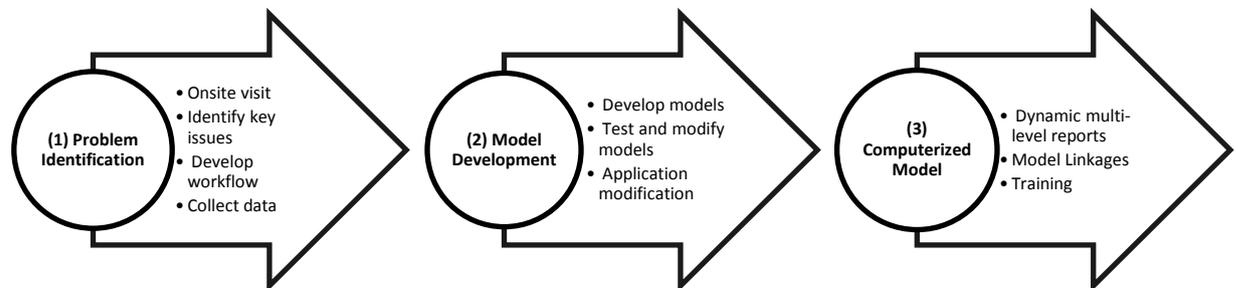


Figure 3: Procedure flowchart

PROCEDURE

1. Meet the management team to assess the overall condition of the company and identify key operation and process issues using mind maps.
2. Meet with the plant manager and sales manager to assess the current key operation processes and identify needs to create workflows.
3. Meet with the financial manager to assess the current operation processes and to identify needs.
4. Gather data and create databases.
5. Develop process models to meet the needs in steps 1, 2, and 3.
6. Test and modify models.
7. Develop dynamic multi-level reports for management.
8. Link applications.
9. Design and provide training sessions.

MODEL VALIDITY

To ensure that the models work and serve needs, all models will be tested and verified by the actual users after the models have been developed. The test period involves both on-site visits from developers and modifications via Skype. In case the



models contain errors or fail to perform, modifications will be implemented. The final step is to get management approval.

MODEL LINKAGE

Once the models have been fully automated and approved by Wongpanit Donmuang management, the individual models are put together and linked so that information can be updated automatically in place of manual updates and shared among operators (see table 2 for summary). In this case, the models are linked via the company intranet.

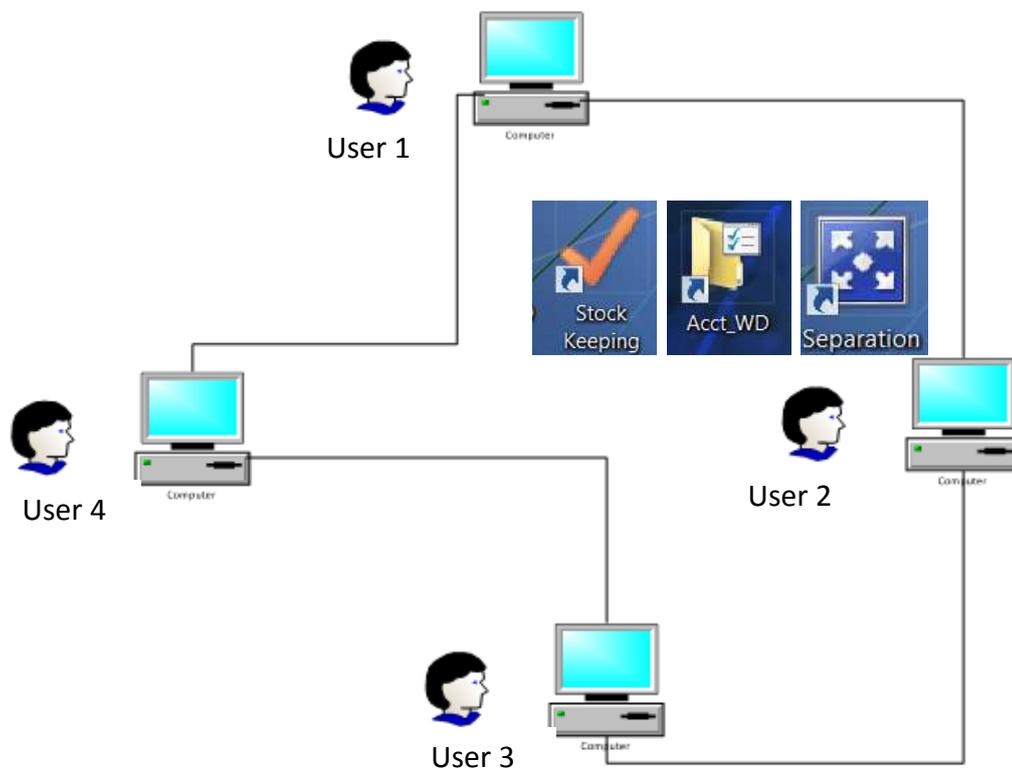


Figure 4: Intranet diagram

Figure 4 shows how users can access and exchange information via an intranet (peer-to-peer). Users can easily use a desktop icon (Stock Keeping, Acct_WD, and Separation) on users' monitors to access and share information. Wongpanit Donmuang intends to share information only within its organization, so intranet networking serves the purpose and provides a low cost and



high security solution. Users' computers can be directly connected with no additional equipment required. Most importantly, it is easy to implement and easy to maintain.

BUSINESS IMPLICATIONS

One of the major advantages of utilizing Microsoft Excel for Wongpanit Donmuang is that most of the existing operation works are based on using fundamental Excel capabilities. This pre-existing model provides easy adaption and implementation both of the improved and new models that will later be turned into application tools. As a result, the company gains cost-effective application tools customized to fit its operations, as summarized in table 2. Three models were developed at Wongpanit Donmuang. The models are divided into two groups: 1) the models developed from existing work, and 2) the new models. With respect to the existing models, the existing Excel worksheets can be categorized into two types. The first type can be considered as document replication meaning that there is no additional utilization of Excel's capabilities. The second type utilizes some basic functions of Excel and therefore can simply be called a work form. However, once the models are developed from existing work and the new models are customized and automated, they become application tools that are easy to use and suit the needs of users at both the operation and management levels.

Table 2: Summary of application tools

No./Attachment	Department	Application Tool	Benefits
1/Attachment 1	Operation	SuperEasy Stock Keeping	1) Record In-Coming Stock 2) Record Out-Going Stock 3) Issue Receipt 4) Financial Report
2/Attachment 2	Accounting	Super Easy Accounting	1) Generate Accounting Code 2) Accounting Entry 3) Automatic Trial Balance 4) Automatic Income Statement and Balance Sheet 5) Cash Flow Statement 6) Ratio Analysis with Suggestions



Table 2: Summary of application tools (continued)

No./Attachment	Department	Application Tool	Benefits
3/Attachment 3	Operation	Recyclable Product Separation	1) Record Main Products 2) Keep Stock for Separated Materials 3) Report materials after Separation Process
4/Attachment 4	Human Resources	Training Lessons	1) Video lessons that can be replayed in MP4 format

ATTACHMENT

Attachment 1: Super Easy Stock Keeping

No	Prod. Code	Product Name	Unit	Orig. Unit	In_Stocking	Cost	Unit_Stocking	Revenue	Inventory	Unit_Price	Orig. Price	Profit
1	1001	Copper #1	kg	264.55	6,664.55	151,664.55	1.50	600.00	8,500.00	570,270.00	164.55	
2	1002	Copper #2	kg	17.50	2,481.00	36,232.50	32.40	2,300.04	3,750.50	312,189.90	180.73	
3	1003	Copper #3	kg	164.00	261.20	43,160.00	4.00	1,000.00	454.15	35,484.00	166.42	
4	1004	Copper #4	kg	161.70	374.40	7,170.00	63.00	310.00	373.00	303,000.00	170.00	
5	1005	Copper	kg	10.70	1.00	150.00	30.00	300.00	-81.00			
6	1006	Brass	kg	3,147.00	143.00	10,700.00	1.00	90.00	2,186.40	378,160.00	160.13	
7	1007	Thin Brass	kg	0.01	70.00	1,000.00	1.00	30.00	39.00			
8	1008	Training Ball	kg	0.01	110.00	12,710.00	1.00	50.00	130.00	-14,998.00	0.00	
9	1009	Copper IronBall	kg	0.01	0.00	301.00	1.00	300.00	0.50	300.00	0.00	
10	1010	Aluminum	kg	0.01	0.00	0.00	1.00	300.00	1.00			
11	1011	Aluminum Tin	kg	1,071.20	31.00	3,500.00	400.00	8,000.00	-2,552.00	-380,100.00	-80.00	
12	1012	Plastic	kg	11.00	4.00	200.00	4,000.00	40,000.00	4,300.00			
13	1013	Aluminum Iron Wire	kg	0.01	0.00	0.00	30.00	370.00	11.00			
14	1014	galvanized	kg	1,620.00	144.00	1,100.00	1.00	410.00	1,100.00	-66,000.00	64.00	
15	1015	galvanized	kg	400.00	40.00	2,000.00	0.20	10.00	410.00	-14,810.00	30.00	

No	Date	Product Code	Product Name	Unit	Unit Cost	Selling Price	Orig. Price	Unit Price	Revenue	Inventory	Unit Price	Profit
1	June 26, 2013	1001	Copper #1	kg	1.0	470.00	186.50	600.00	600.00			413.50
2	June 26, 2013	1001	Copper #2	kg	22.8	370.81	174.00	183.00	2,800.04			1,916.84
3	June 26, 2013	1001	Copper #3	kg	9	300.00	318.00	340.00	3,200.00			218.00
4	July 1, 2013	1004	Copper #4	kg	30	25.00	357.91	350.00	310.00			160.00
5	July 1, 2013	1005	Copper	kg	30	10.00	62.31	161.00	300.00			-41.90
6	July 1, 2013	1006	Brass	kg	1.0	30.00	600.00	110.00	600.00			200.00
7	July 1, 2013	1007	Thin Brass	kg	1	10.00	4.00	4.00	30.00			16.00
8	July 1, 2013	1008	Training Ball	kg	1.0	30.00	30.00	230.00	30.00			-197.00
9	July 1, 2013	1009	Copper IronBall	kg	2	100.00	62.00	300.00	300.00			3.00
10	July 1, 2013	1010	Aluminum	kg	1	300.00		300.00	300.00			-1.00
11	July 1, 2013	1011	Aluminum Tin	kg	400.0	27.25	70.00	300.00	8,200.00			-224.00
12	July 1, 2013	1012	Plastic	kg	400.0	8.00	40.00	40.00	36,200.00			-400.00
13	July 1, 2013	1013	Aluminum Iron Wire	kg	30.0	20.70		370.00	370.00			-40.00
14	July 1, 2013	1014	galvanized	kg	3.8	144.00	40.13	40.00	370.00			-400.00
15	July 1, 2013	1015	Copper #1	kg	0.01	300.00	30.00	30.00	30.00			-27.00
16	July 1, 2013	1016	galvanized	kg	3.8	32.40	34.80	30.00	300.00			-143.30
17	July 1, 2013	1017	galvanized	kg	1	10.00	14.00	15.00	330.00			10.00



Figure 5: Stock keeping

Good stock keeping is vital to recycle business. In the case of Wongpanit Donmuang, there are 7,777 products in the stock which has been recorded by hand. Management could not check company's stock status. Tracking daily movement of buying and selling activities was a strenuous task. With the Super Easy Stocking Keeping, in-coming, out-going, issuing receipts can be done in minutes. In figure 5, section 1 illustrates a summary of *product information*. The first four columns are used as data entry where product codes, product names, and product units can be input. From fifth column onward shows beginning inventory, in-coming and out-going items with the summary of the cost of each item, current inventory, average stock, average price, and maximum price. Section 2 of figure 5 is where items can be taken out by simply keying product code into the third column, enter quantity in column six, and key in the product price then the rest of other information will be automatically process. The green and red cells at the last column indicates stock status where by the red cells show stock out and green cells indicate that there are some units left in stock. Likewise users are required to key in just product code, quantity and price of each item the rest of information is processed automatically. One of the important pieces of information included in part 2 of figure 5 is maximum price of each item. This purpose of this is to prevent items from being under sold due to a price jump of some items. In brief, this application is something new to Wongpanit Donmuang that has been tested and modified for 7 months. There will still be some functions that should be incorporated to it such as scanning capability and report on stock cycle of each item.



Attachment 2: Super Easy Accounting

1

Code	ACCT_Sing Name	ACCT_Thai Name	ACCT Type
1000	Cash	เงินสด	Asset
1010	Current account - BBL	บัญชีเงินฝากออมทรัพย์	Asset
1020	Current account - SCB	บัญชีเงินฝากออมทรัพย์	Asset
1030	Saving account - BBL	บัญชีเงินฝากออมทรัพย์	Asset
1040	Saving account - SCB	บัญชีเงินฝากออมทรัพย์	Asset
1050	Time deposits with 3 mth	บัญชีเงินฝากออมทรัพย์	Asset
1060	Time deposits with 3 mth	บัญชีเงินฝากออมทรัพย์	Asset
1070	Account receivable - Trade	บัญชีเงินฝากออมทรัพย์	Asset
1080	Account receivable - Other	บัญชีเงินฝากออมทรัพย์	Asset
1090	Advance payment for employees	บัญชีเงินฝากออมทรัพย์	Asset
1100	Prepaid expense - Others	บัญชีเงินฝากออมทรัพย์	Asset
1110	Prepaid expense - Insurance	บัญชีเงินฝากออมทรัพย์	Asset
1120	Other prepaid asset - Current	บัญชีเงินฝากออมทรัพย์	Asset
1130	Advance for doubtful accounts	บัญชีเงินฝากออมทรัพย์	Asset
1140	Fixed assets	บัญชีเงินฝากออมทรัพย์	Asset
1150	10000 in hand	บัญชีเงินฝากออมทรัพย์	Asset

2

Date	Particulars	Debit	Credit	Balance
January 1, 2013	10000 in hand	10,000.00		10,000.00
January 2, 2013	Current account - BBL	800.00		9,200.00
January 3, 2013	Current account - BBL	800.00		8,400.00
January 4, 2013	Current account - BBL	800.00		7,600.00
January 5, 2013	Current account - BBL	800.00		6,800.00
January 6, 2013	Current account - BBL	800.00		6,000.00
January 7, 2013	Current account - BBL	800.00		5,200.00

3

ACCT Code	ACCT Name	Control	Balance	Jan	July
100000	Cash	Debit	10,000.00		
101000	Other Current Asset - Deposit	Debit			
110000	Fixed Assets	Debit			
120000	Accumulated depreciation - Building	Credit			
130000	Accumulated depreciation - Office equipment	Credit			
140000	Accumulated depreciation - Vehicle	Credit			
200000	Accounts Payable	Credit			
300000	Equity	Credit			
310000	Common Stock	Credit			
320000	Retained Earnings	Credit			
400000	Revenue	Credit			
500000	Cost of Sales	Debit			
600000	Operating Expenses	Debit			
700000	Other Income	Credit			
800000	Other Expense	Debit			
900000	Other Asset	Debit			
1000000	Other Liability	Credit			

4

Account Name	Jan	Jan - July	Total
Sales	0.00	0.00	6,000.00
Selling Cost	0.00	0.00	6,000.00
Profit	0.00	0.00	0.00
Other Income	0.00	0.00	0.00
Operating Expense	0.00	0.00	0.00
Wages and Salary	0.00	0.00	0.00
Taxes Provision	0.00	0.00	0.00
Commission	0.00	0.00	0.00
Express Way	0.00	0.00	0.00
Transportation	0.00	0.00	0.00
Office Expenses	0.00	0.00	0.00
Car Depreciation	0.00	0.00	0.00
Other Depreciation	0.00	0.00	0.00
Other Expense	0.00	0.00	0.00
Other Asset	0.00	0.00	0.00
Other Liability	0.00	0.00	0.00
Other Income	0.00	0.00	0.00
Other Expense	0.00	0.00	0.00
Other Asset	0.00	0.00	0.00
Other Liability	0.00	0.00	0.00
Other Income	0.00	0.00	0.00
Other Expense	0.00	0.00	0.00
Other Asset	0.00	0.00	0.00
Other Liability	0.00	0.00	0.00



Figure 6:Accounting entry and financial statement

The accounting application presented here is adapted from Excel worksheets of Wongpanit Donmuang. There are five parts shown in figure 6 of the attachment 6. To begin using the application, users key in accounting code, accounting name both English and Thai. Then users can do their debits and credits on the second part without having to worry about the balance of their debits and credits because the application has a built-in warning and re-check functions. In addition, users can choose to use English or Thai accounting name for their account entries. Once debits and credits have been entered, trial balance and monthly financial statements are generated automatically as shown in part 3 and 4. This makes it easy and more convenient for small business owners to do their accounting. With this first version of the Super Easy Accounting, users can perform a whole year accounting solution. In order to make this application complete, a statement of cash flow and financial analysis will be added to the later version.

Attachment 3: Recyclable Product Separation

Date	Product	Quantity	Sell as Second Hand	Price	Amount	Invt	Weight (Kg.)	Unit	Separation Date	Time in Stock	Iron	Alumina
June 13, 2013	Pepsi Cooler	1.00		100	---	1	4.2	Kg.	June 13, 2013	0	20	1
June 13, 2013	Pepsi Cooler	2.00			---	2	4.2	Kg.	June 13, 2013	0	40	2
June 13, 2013	Pepsi Cooler	3.00	1	50	50	2	4.2	Kg.	June 14, 2013	1	40	2
June 13, 2013	Pepsi Cooler	2.00			---	2	4.2	Kg.	June 15, 2013	2	40	2
June 20, 2013	Pepsi Cooler	3.00	1		0	2	4.2	Kg.	June 16, 2013	-4	40	2
June 21, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 17, 2013	-4	400	20
June 22, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 18, 2013	-4	400	20
June 23, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 19, 2013	-4	400	20
June 24, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 20, 2013	-4	400	20
June 25, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 21, 2013	-4	400	20
June 26, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 22, 2013	-4	400	20
June 27, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 23, 2013	-4	400	20
June 28, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 24, 2013	-4	400	20
June 29, 2013	Pepsi Cooler	20.00			---	20	4.2	Kg.	June 25, 2013	-4	400	20



Product	Quantity	Sell as Second Hand	Price	Amount	Invt	Weight (Kg.)	Time in Stock	Aluminu	Iron
Pepsi Cooler	1	(blank)	100	---	1	4.2	0	1	20
	2	(blank)	(blank)	---	2	4.2	0	2	40
	3	1	50	50	2	4.2	1	2	40
			(blank)	0	2	4.2	-4	2	40
	20	(blank)	(blank)	---	20	4.2	-4	20	400
							129	20	400
(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)
Grand Total									

Figure 7: Example of data input and report

For recycle business, product separation process is a vital part of business because it can add more value to products. Normally recyclable products can be either sold as second hand products or product parts can be separated and sorted to their categories. One of the major problems at Wongpanit Donmuangis how to keep track of what products are sold and what products are separated into parts because products come in a big lot. To deal with this issue, MRP concept provides the best approach to solve this complex issue. Normally, MRP is an important working concept for production planning whereby it helps preparing number of raw materials in sequential order for manufacturing products. Picture 1 of figure 7 is where products' data are recorded begin with products' name in column 2, quantity in column 3, item sold as second hand in column 4, buying price per lot in column 5, and separation date.

The report calculates the total time of item in stock from the date it was bought until it was separated. The rest of the information reported is disassembled parts of products as shown in table 1. The second part of figure 7 illustrates an interactive report that can be customized by users to view information from the part 1. There is also the refresh button on the upper left hand corner to update information. This makes it easy for users to update new information in an instant. Since this application is still in its first stage of development, there are many issues need to be fulfilled.



Attachment 5: Training Lessons

Most Microsoft Excel users are familiar with basic functions and formula but they are unfamiliar with some of the advance functions and techniques. Therefore training lessons are created in MP 4 format by using screen capturing technique that enables users to later review the lessons that show both video and audio (see figure 8). The lesson captures all working steps form the start until the last step with pictures, and voice of participants.

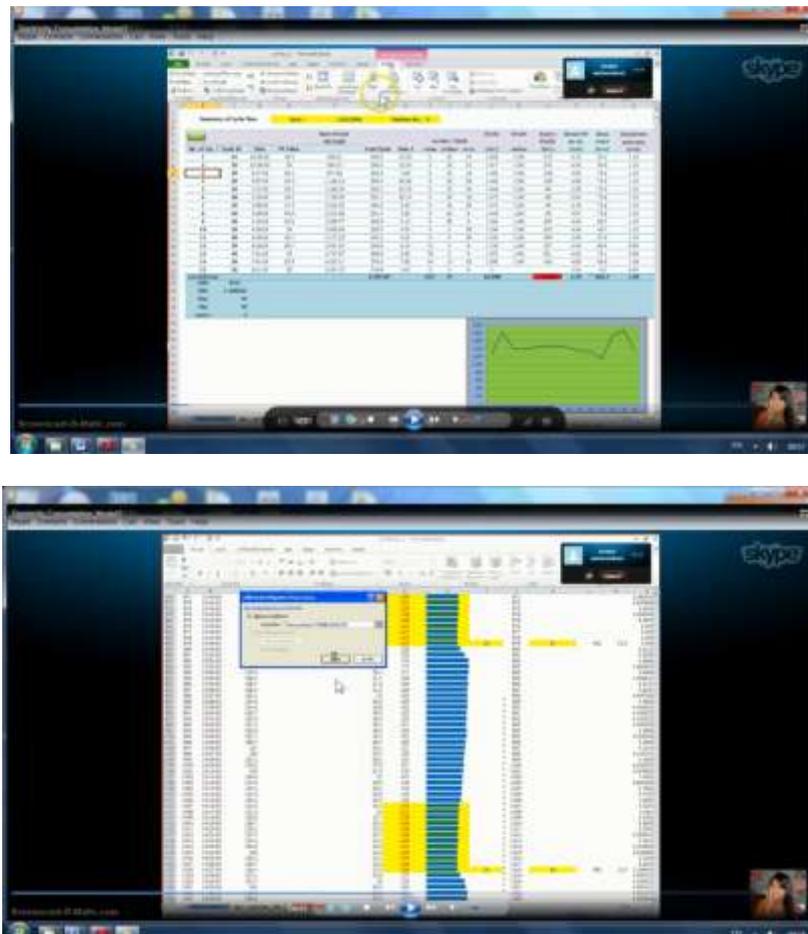


Figure 8: Live lesson created via Skype



REFERENCES

- Albright, S.C., Broadie, M. and Winston, W.L., (2001), *Practical Management Science*. Duxbury Thomson Learning, Australia.
- Alexander, M. and Walkenbach, J., (2010), *Excel Dashboards & Reports*. Wiley Publishing Inc., Indianapolis, Indiana.
- Meredith, R. and Mantel, J.Jr., (2006), *Project Management*. Wiley Publishing Inc., Indianapolis, Indiana.
- Krajewski, L.J., and Ritzman, L.P., (2005), *Operations Management Processes and Value Chains*. 7th Ed. Pearson Prentice Hall, Saddle River, New Jersey.
- Mimongkol, A., (2010), *Wireless LAN*, 2nd Ed., InfoPress, Bangkok.
- Nadtaya, C., (2013), *Access Workshop*, SPC Books, Bangkok.
- Walkenbach, J., (2010), *Excel 2010 Formulas*, Wiley Publishing, Inc. Indianapolis, Indiana.
- Walkenbach, J., (2010), *Excel 2010 Power Programming with VBA*, Wiley Publishing, Inc. Indianapolis, Indiana.
- Walkenbach, J., (2010), *Excel VBA Programming for Dummies*, 2nd Ed. Wiley Publishing, Inc. Indianapolis, Indiana.
- Walkenbach, J., (2009), *Statistical Analysis with Excel for Dummies*, Wiley Publishing, Inc. Indianapolis, Indiana.