PROGRAM DEMONSTRATION

This chapter presents examples of the operations in each section demonstrated in the previous chapter. Two significant sections that will be presented are product classification and coding section and WOS database section.

5.1 Classification and Coding System

In this section, examples of 6 operations, which are non-assembly product add and edit, assembly product add and edit, product structure, and product search, are presented.

5.1.1 Non-assembly product add

This operation concerns adding new product, which will be classed, coded, and recorded into the database. Once the program is started successfully, the menu screen will be displayed like the one in figure 5.1
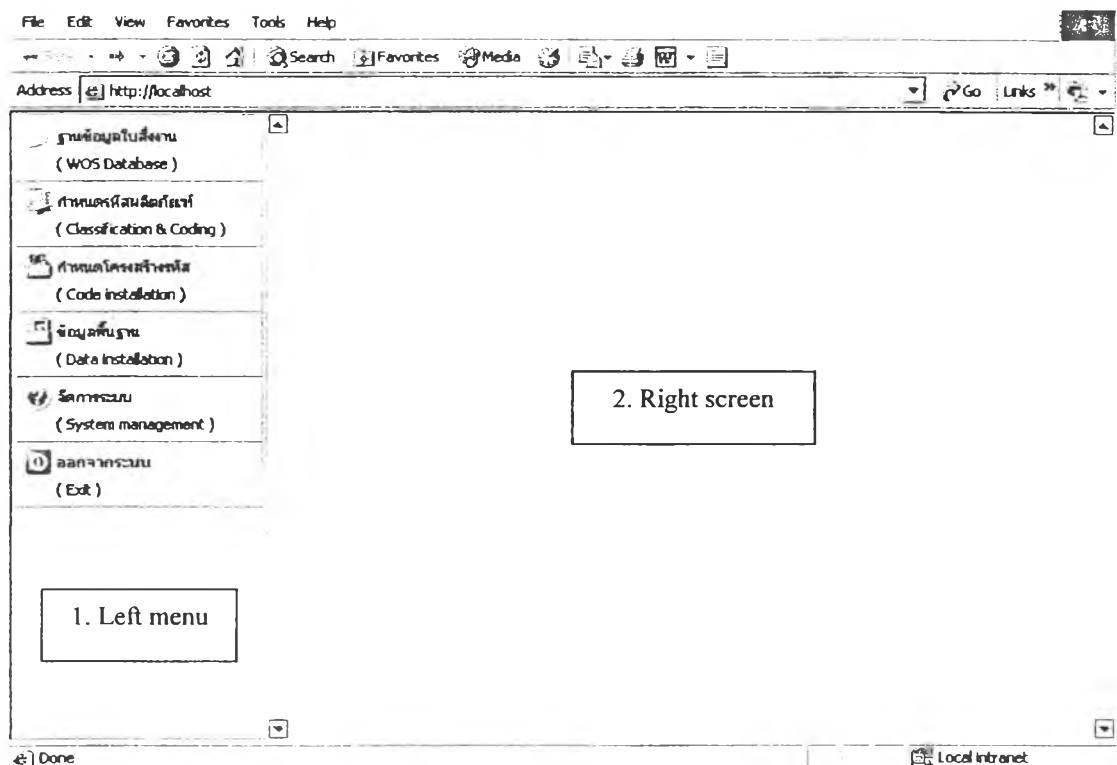

Figure 5.1: Master screen of the program

To add new product into the system, user has to select classification and coding from the left menu bar and then select non-assembly product from the sub-menu as shown in figure 5.2.
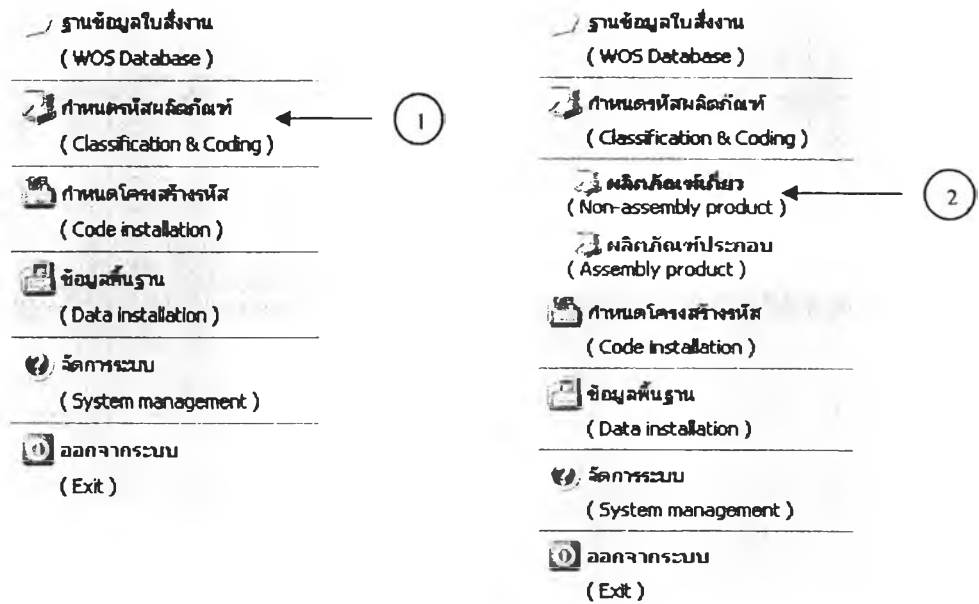

Figure 5.2: Left menu bar

Then Non-assembly product will be displayed as shown in figure 5.3. On the screen, user has to select add from the top menu.

Figure 5.3: Non-assembly product screen

Once "Add form" (figure 5.4) is displayed, user has to fill all data and then click ok.

เพิ่มผลิตภัณฑ์เดี่ยว
(Add Non-assembly product)

รหัสหลัก A (รูปร่างหลัก): Rotational product ▾
รหัสหลัก B (รูปร่างภายนอก) : All smooth ▾
รหัสหลัก C (เส้นผ่านศูนย์กลางวัสดุ) : 1-10 ▾
รหัสหลัก D (ความยาววัสดุ) : 0-10 ▾
รหัสหลัก E (ลักษณะพื้นผิว) : Polishing surface ▾
รหัสหลัก F (ชนิดวัสดุ) : MS ▾
รหัสหลัก G (ความละเอียด) : 0.01-0.025mm ▾
ชื่อผลิตภัณฑ์ (Product name) : Punch Cutter 307 D
หมายเลขแบบ (Drawing No.) : TL6-82
ชื่อแบบ (Drawing Name) : Punch Cutter 307 D
ชื่อผู้เขียน (Drawer) : Jaroon
ไฟล์แบบ (File name) : [   ] Browse...

21 Feb 2005
< >

S	M	T	W	T	F	S
		1	2	3	4	5
วันที่ (Date): 6	7	8	9	10	11	12
13	14	15	16	17	18	19
20		22	23	24	25	26
27	28	1				

Ok ↘
(เพิ่ม | ยกเลิก)

Figure 5.4: Adding new non-assembly product

Product will be coded and recorded into the system as shown in the figure 5.5.

ข้อมูลผลิตภัณฑ์เดี่ยว
(Non-assembly product)

ค้นหา(Search) / เพิ่ม(Add) / พิมพ์ข้อมูล(Report)

รหัสผลิตภัณฑ์ (Product Code)	หมายเลขแบบ (Drawing No.)	ชื่อผลิตภัณฑ์ (Product name)	ชื่อแบบ (Drawing name)	ชื่อผู้เขียน (Drawer)	วันที่ (Date)			
1-0-322-201-Pun-0001	TL6-82	Punch Cutter : 307 D	Punch Cutter : 307 D	Jaroon	02 Dec 2004			

ค้นหา(Search) / เพิ่ม(Add) / พิมพ์ข้อมูล(Report)

ดูแบบตัวอย่าง (See drawing| แก้ไขข้อมูล(Edit)| ลบข้อมูล(Delete)

Figure 5.5: Result of adding new non-assembly product

5.1.2 Non-assembly product edit

Normally, it is unsuitable to change product data since the product code will be changed, which causes confusion. To prevent it, user will be allowed to change only

product name, drawing number, drawer and date, and the program will fix the product code even product profile was changed. Consequently, it is better for user has to delete old data and record the new one, when changes that can affect the product code occur. To edit data, user has to select icon ⟋ from the right menu bar shown in figure 5.5. Then, the edit menu will appear. When finish editing, user has to click ok button. The new data will be recorded.

เมนูแก้ไขข้อมูล
(Edit menu)

ชื่อผลิตภัณฑ์ (Product name):	Punch Cutter : 307 D
หมายเลขแบบ (Drawing No.):	TL6-82
ชื่อแบบ (Drawing name):	Punch Cutter : 307 D
ชื่อผู้เขียน (Drawer):	Jaroon
ไฟล์แบบ (File name):	Browse...
วันที่ (Date):	02 Dec 2004
Ok	แก้ไข ยกเลิก

Figure 5.6: Editing data of non-assembly product

5.1.3 Assembly product add

As well as non-assembly product add, user has to select "add" from top menu of assembly product screen.

Figure 5.7: Assembly product screen

"Add Assembly product" form (figure 5.8) will be displayed.

เพิ่มผลิตภัณฑ์
(Add Assembly product)

รหัสหลัก T (สถานะ) : ชิ้นงานสมบูรณ์ ▾

รหัสหลัก U (ประเภท) : เครื่องจักรขนาดใหญ่ ▾

รหัสหลัก V (จำนวนส่วนประกอบ) : 10 < X <= 30 ชิ้น ▾

รหัสหลัก W (ประกอบโดย) : เชื่อมเป็นหลัก ▾

ชื่อผลิตภัณฑ์ (Product name) : Conveyor for Feeder & Stacker

หมายเลขแบบ (Drawig No.): 0085-MC-01-A

ชื่อแบบ (Drawing name): Conveyor for Feeder & Stacker

ชื่อผู้เขียน (Drawer): Tavat P.

ไฟล์แบบ (File name): [ ] Browse...

02 Dec 2004

< >

S	M	T	W	T	F	S
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

วันที่ (Date):

OK เพิ่ม | ยกเลิก

Figure 5.8: Adding new assembly product

When user finishes filling all data, the product will be coded and recorded.

ข้อมูลผลิตภัณฑ์ประกอบ
(Assembly product)

ค้นหา(Search) / เพิ่ม(Add) / พิมพ์ข้อมูล(Report)

รหัสผลิตภัณฑ์ (Product code)	หมายเลขแบบ (Drawing No.)	ชื่อผลิตภัณฑ์ (Product name)	ชื่อแบบ (Drawing name)	ชื่อผู้เขียน (Drawer)	
2-0300-Sid-0001	0085-MC-01-I	Side Plate all	Conveyor for Feeder & Stacker	Tavat	
2-1310-Con-0001	0085-MC-01-A	Conveyor for Feeder & Stacker	Conveyor for Feeder & Stacker	Tavat	

ค้นหา (Search) / เพิ่ม (Add) / พิมพ์ข้อมูล (Report)

โครงสร้าง (Product structure)| ดูแบบ (Drawing)| ส่วนประกอบ (Components)| แก้ไขข้อมูล (Edit)| ลบข้อมูล (Delete)

Figure 5.9: Result of adding new assembly product

5.1.4 Assembly product edit

In this section, user can edit data of assembly product. However, changing in some data can affect the product code, which causes confusion to user. Therefore, the

system will fix the product code even data is changed. Consequently, it is better to delete old product and add new one than edit it in order to avoid the confusion. To edit data, user has to select icon ⟋ from right menu bar. Then user will be allowed to edit data. When user finishes editing, click ok and the new data will be saved.

เมนูแก้ไขข้อมูล
Edit menu

ชื่อผลิตภัณฑ์ (Product name) : Conveyor for Feeder & Stacke

หมายเลขแบบ (Drawing No.): 0085-MC-01-A

ชื่อแบบ (Drawing name): Conveyor for Feeder & Stacke

ชื่อผู้เขียน (Drawer): Tavat

ไฟล์แบบ (File name): Browse...

Ok (แก้ไข | ยกเลิก |

Figure 5.10: Editing data of assembly product

5.1.5 Product structure

Once an assembly product was recorded and coded, user can add its components by selecting icon ⬚ or ⬚ from the right menu bar (see figure 5.9). If the components are non-assembly product, user will has to select ⬚. If the component is an assembly product, user will has to select ⬚. Whether assembly or non-assembly product is selected, the component menu will appear as shown in figure 5.11.

To add components, user has to select add component from the top menu at components screen. Then the Add components screen will appear. User can select the component from the tool box and also specify quantity of it. When user clicks ok, the component will be recorded.

ส่วนประกอบผลิตภัณฑ์
(Components)

ค้นหา (Search) / เพิ่มส่วนประกอบ (Add components)

รหัส (Product code) ▾	ชื่อผลิตภัณฑ์ (Product name)	หมายเลขแบบ (Drawing No.)	จำนวน (Quantity)	
1-1-505-001-Sid-0001	Side Plate A - RH	0085-MC-01-B	1	⌖
1-1-505-001-Sid-0002	Side Plate A - LH	0085-MC-01-C	1	⌖
1-1-505-001-Sid-0003	Side Plate B - LH	0085-MC-01-D	1	⌖
1-1-505-001-Sid-0004	Side Plate B -RH	0085-MC-01-E	1	⌖

ค้นหา (Search) / เพิ่มส่วนประกอบ (Add components)

แก้ไขข้อมูล(Edit) | ลบข้อมูล(Delete)

Figure 5.11: Component of assembly product screen

เพิ่มส่วนประกอบ
(Add components)

ชื่อ(Name) : 1-0-322-201-Pun-0001 Punch Cutter : 307 D TL6-82 ▾

จำนวน(Qty) :

Ok เพิ่ม ยกเลิก

Figure 5.12: Add components screen

To see overall structure of the product, user has to select icon ⌖ from the Assembly product screen. The structure will be displayed. For example, to see components of Conveyor for feeder & stacker, user has to click the button.

⊞ 2-1310-Con-0001 (Conveyor for Feeder & Stacker)

⊟ 2-1310-Con-0001 (Conveyor for Feeder & Stacker)
  ⊞ 2-0300-Sid-0001 (Side Plate all)
  1-0-250-100-Fre-0001 (Free Roller)
  1-1-531-000-Squ-0001 (Square bar)
  1-1-522-001-Usu-0001 (USupport)
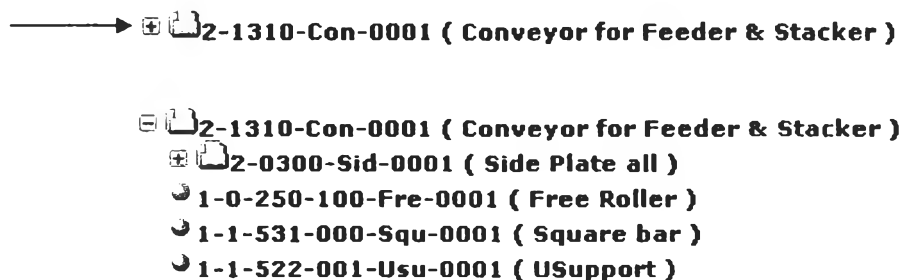
Figure 5.13: Components of Conveyor for Feeder & Stacker

It shows that the product is compound of 1 assembly component and 3 non-assembly components. To see components of Side Plate all, user has to click the button. Then components of Side Plate will be shown.

2-1310-Con-0001 (Conveyor for Feeder & Stacker)
 2-0300-Sid-0001 (Side Plate all)
   1-1-505-001-Sid-0004 (Side Plate B -RH)
   1-1-505-001-Sid-0003 (Side Plate B - LH)
   1-1-505-001-Sid-0002 (Side Plate A - LH)
   1-1-505-001-Sid-0001 (Side Plate A - RH)
 1-0-250-100-Fre-0001 (Free Roller)
 1-1-531-000-Squ-0001 (Square bar)
 1-1-522-001-Usu-0001 (USupport)
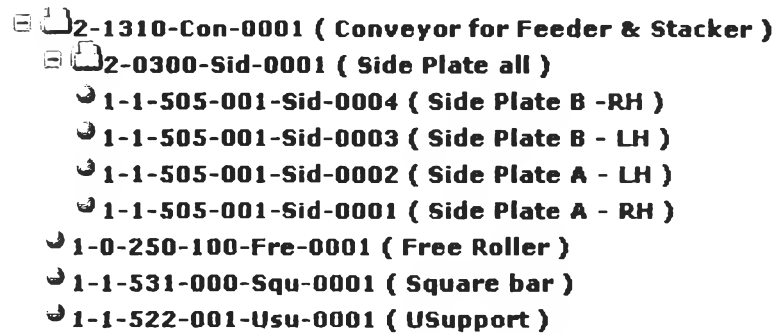
Figure 5.14: Components of Side Plate All

5.1.6 Product search

To find a product, user has to select add button, which is available in every screens. According to the operation chart of the "product search" section (figure 4.7), there are 6 ways to search for a product.

1. Search by product code.

2. Search by product name

3. Search by drawing number

4. Search by drawing name

5. Search by drawer's name

6. Search by date

User can fill available data into the "Product search" form shown in figure 5.15.

1. Search by product code: Sample code = "1-1-505-001-Sid-002"

User has to fill product code in the form and then click ok.

<u>ค้นหาผลิตภัณฑ์</u>
(Product search)

รหัสผลิตภัณฑ์ (Product code):	1-1-505-001-Sid-002
ชื่อผลิตภัณฑ์ (Product name):	
หมายเลขแบบ (Drawing No.):	
ชื่อแบบ (Drawing name):	
ชื่อผู้เขียน (Drawer):	
วันที่ (Date):	04 Dec 2004 ☑ ทุกวัน

Ok ⟨ กรองข้อมูล ⟩ ยกเลิก

Figure 5.15: Searching product by product code

The result of searching is shown as follow:

Figure 5.16: Result of searching product by product code

As we can see that the product having the sample code is found and shown on the screen.

2. Search by product name: Sample name = "Die Cutter"

User has to fill product name in the form and then click ok.

Figure 5.17: Searching product by product name

The result of searching is shown as follow:

Figure 5.18: Result of searching product by product name

From the result screen, there are two products name "Die Cutter" in the database. Therefore, user will be able to choose the required product from there.

3. Search by drawing number: Sample number = "TL5"

User has to fill drawing number in the form and then click ok.

Figure 5.19: Searching product by drawing number

The result of searching is shown as follow:

Figure 5.20: Result of searching product by drawing number

From the result screen, there are two products that have drawing number beginning with "TL5". Therefore, user will be able to choose the required product from there

4. Search by drawing name: Sample name = "Conveyor"

User has to fill drawing name in the form and then click ok.

<u>ค้นหาผลิตภัณฑ์</u>
(Product search)

รหัสผลิตภัณฑ์ (Product code):

ชื่อผลิตภัณฑ์ (Product name):

หมายเลขแบบ (Drawing No.):

ชื่อแบบ (Drawing name): Conveyor

ชื่อผู้เขียน (Drawer):

วันที่ (Date): 04 Dec 2004   ☑ ทุกวัน

กรองข้อมูล   ยกเลิก

Figure 5.21: Searching product by drawing name

The result of searching is shown as follow:

<u>ข้อมูลผลิตภัณฑ์เดี่ยว</u>
(Non-assembly product)

การช่วยเหลือ >> ชื่อแบบ : Conveyor   ค้นหา(Search) / เพิ่ม(Add) / รายงานข้อมูล(Report)

รหัสผลิตภัณฑ์ (Product Code)	เลขาบบแบบ (Drawing No.)	ชื่อผลิตภัณฑ์ (Product name)	ชื่อแบบ (Drawing name)	ชื่อผู้เขียน (Drawer)	วันที่ (Date)			
1-0-250-100-Fre-0001	008S-MC-01-H	Free Roller	Conveyor for Feeder & Stacker	Tavat	03 Dec 2004			
1-1-505-001-Sid-0001	008S-MC-01-B	Side Plate A - RH	Conveyor for Feeder & Stacker	Tavat	03 Dec 2004			
1-1-505-001-Sid-0002	008S-MC-01-C	Side Plate A - LH	Conveyor for Feeder & Stacker	Tavat	02 Dec 2004			
1-1-505-001-Sid-0003	008S-MC-01-D	Side Plate B - LH	Conveyor for Feeder & Stacker	Tavat	03 Dec 2004			
1-1-505-001-Sid-0004	008S-MC-01-E	Side Plate B -RH	Conveyor for Feeder & Stacker	Tavat	02 Dec 2004			
1-1-522-001-Usu-0001	008S-MC-01-F	USupport	Conveyor for Feeder & Stacker	Tavat	03 Dec 2004			
1-1-531-000-Squ-0001	008S-MC-01-G	Square bar	Conveyor for Feeder & Stacker	Tavat	03 Dec 2004			

ค้นหา(Search) / เพิ่ม(Add) / รายงานข้อมูล(Report)

คุณสมบัติตัวอย่าง (See drawing)   แก้ไขข้อมูล(Edit) | ลบข้อมูล(Delete)

Figure 5.22: Result of searching product by drawing name

All products having drawing name "Conveyor" will be found and shown. Therefore user may have to use more information to find the required product.

5. Search by drawer's name: Sample name = "Tavat"

User has to fill drawing name in the form and then click ok.

Figure 5.23: Searching product by name of drawer

The result of searching is shown as follow:

Figure 5.24: Result of searching product by name of drawer

All product drawings that are written by drawer names Tavat will be exposed.

6. Search by date: Sample date = "2 December 2004"

User has to select date that product was recorded in the form and then click ok.

Figure 5.25: Searching product by drawing date

The result of searching is shown as follow:

Figure 5.26: Result of searching product by drawing date

Products recorded by the required date will be revealed.

5.2 Database system

The concept of WOS database section is similar to the previous section. To add, search, edit, or delete, users can select the same icons. To access WOS database section, user has to select "WOS database" from the left menu.
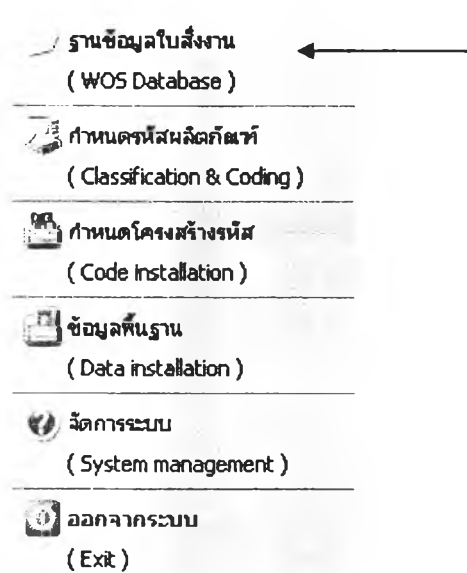
Figure 5.27: Getting into WOS database section

Shown in figure, the main menu of WOS database will appear.

Figure 5.28: Work Order Sheet screen

To record a WOS, user has to fill all data in six sections, which are Main data, Operation step, Material data, Plating data, Operation detail, and Store.

5.2.1 Main data

To add WOS, user has to record

1. WOS No.

2. Product code

3. Customer name

4. Order date: The date that customer orders product

5. Start date: The date that the director writes WOS

6. End date: The date that product is delivered to customer

7. Quantity of product and the number of customer purchasing order.

Figure 5.29: "Add WOS" screen

Figure 5.30: Result of adding main data of WOS

5.2.2 Operation step

Operation step can be called manufacturing step of a product. Once main data was added, user has to record operation steps of the product in WOS by clicking 🖾 icon. The operation step screen will appear.

Figure 5.31: "Operation step" screen

To add operation step, click "Add operation step". Add operation step form will appear.

Figure 5.32: "Add operation step" screen

5.2.3 Material data

Once manufacturing steps of a product are recorded, user has to record material data. To record material used in WOS, user has to click 🗋, then "Material" screen will appear.

ข้อมูลวัสดุ
(Material)

เพิ่มวัสดุ(Add material)

ชื่อวัสดุ (Material) ▼	ขนาด (Size)	จำนวน (Qty)	ใบสั่งซื้อ (P/O No.)	ผู้ตรวจสอบ (Inspecter)	ผู้จำหน่าย (Supplier)	ราคา (Price)		
SKD11	o100x30	2	4565578	นาย ง	Supplier1	2,000		

เพิ่มวัสดุ(Add material)

แก้ไขข้อมูลวัสดุ(Edit) | ลบข้อมูล(Delete)

Figure 5.33: "Material" screen

To add material data, user has to click "Add material". Then, "Add material" screen will appear. User is requested to add material name, supplier, size of material, quantity of material, price, purchasing order number, and inspector who verify material before sending it to the production process.

เพิ่มวัสดุ
(Add material)

ชื่อวัสดุ(Material name): [SKD11 ▼]

ชื่อผู้จำหน่าย(Supplier) : [Supplier1 ▼]

ขนาด(Size) : [o100x30]

จำนวน(Quantity): [2]

ราคา(Price): [2,000]

ใบสั่งซื้อ(P/O No.): [4565578]

ผู้ตรวจสอบ(Inspector): [นาย ง ▼]

เพิ่ม | ยกเลิก

Figure 5.34: "Add material" screen

5.2.4 Plating data

Once material data of a product is recorded, user has to record plating data. To record plating data in WOS, user has to click ⊑ then "Plating" screen will appear.

Figure 5.35: "Plating" screen

To add plating data, user has to click "Add plating", then "Add plating" screen will appear. User is required to record plating types, supplier name, required hardness, result hardness, price, purchasing order number, and inspector who verify hardness before return the product into the production process.

Figure 5.36: "Add Plating" screen

5.2.5 Operation detail

Once plating data of a product is recorded, user has to record operation details or manufacturing details of the product in WOS. To record operation detail, user has to click ดู, then "Operation Data" screen will appear.

ข้อมูลการทำงาน
(Operation data)

Figure 5.37: "Operation data" screen

To add operation data, user has to click "Add operation", then "Add operation" screen will appear. Since some manufacturing steps, operation step, can be outsourced, user has to choose whether it is done by worker or supplier. If it is outsourced, user will record supplier name and purchasing order number. If it is manufactured by worker, user will record worker's name and machine number. Then operation name, start date and time, finish date and time, quality control, and inspector will be recorded for both cases.

เพิ่มการทำงาน
(Add operation)

Figure 5.38: "Add operation" screen

เพิ่มการทำงาน
(Add operation)

○ จ้างทำ ○ ผลิตเอง

ผู้จำหน่ายและผลิต : | Supplier1 ▾ |

หมายเลขใบสั่งซื้อ(P/O No.): | |

รายละเอียก(Details) : | กลึงธรรมดา ▾ |

วันที่เริ่ม(Start): | 06 Dec 2004 |

วันที่เสร็จ(End): | 06 Dec 2004 |

เวลาเริ่ม(Start) | 01 ▾ | : | 00 ▾ |

เวลาเสร็จ(End): | 01 ▾ | : | 00 ▾ |

ผลการตรวจ(Quality): ○ ผ่าน ○ ไม่ผ่าน

ผู้ตรวจสอบ(Inspected by): | นาย ก ▾ |

เพิ่ม | ยกเลิก

Figure 5.39: "Add operation" screen (Outsourcing)

5.2.6 Store

Finally, user has to record the store data, which are material cost, outsourcing cost, manufacturing cost, sale price, delivery date, inspector, sender, and receiver. To record sore data, user has to click ⌨, then "Store data" screen will appear.

รับเข้าสโตร์
(Store data)

ค่าวัสดุ(Material cost): | 1354 |

ค่าจ้างภายนอก(Other cost): | 577 |

ค่าจ้างภายใน(Manufacturing cost): | 1200 |

รวม(Total cost): | 3131 |

วันที่ส่งมอบเข้าสโตร์(Received date): | 06 Dec 2004 |

ผู้ตรวจเช็ค(Inspected by): | นาย ข ▾ |

ผู้ส่ง(Sended by): | นาย ค ▾ |

ผู้รับ(Received by): | นาย ง ▾ |

ราคาขาย(Sale price): | 4500 |

แก้ไข | ยกเลิก

Figure 5.40: "Store data" screen

5.2.7 Report

When all data in six sections were recorded, user can see and print all data by clicking ⊜ , and then the WOS will appear.

Figure 5.41: "Report" screen

After the developed system has been applied, product could be classified and coded easily and quickly. The WOS data was recorded and kept safety and easily to be traced. Therefore the searching time is significantly reduced.

5.2.8 Standard time estimation

Once operation data in WOS was recorded, the system will calculate the standard time of a product immediately. The system will find the average, minimize, and maximize time for each operation, and also summarize days spent, customers, WOS No. on the "product report" screen. Therefore, the case company will be able to estimate production time quickly from this screen.

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Figure 5.42: "Standard time estimation" screen