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## **APPENDICES**

**APPENDIX A**  
**TIRE MANUFACTURING PROCESS**

## TIRE MANUFACTURING PROCESS

The objective of this chapter is to give you the idea what the tire manufacturing process is all about.

### Tire Manufacturing

The steel belted radial passenger and light truck tires are normally consisted of an inner liner, two polyester reinforced body plies, two steel beads, two bead reinforcing strips, two anti-chafing strips, two steel belts, the sidewalls, and the tread. Some tires include one or two layers of nylon or polyester constricting belts or strips between the steel belts and the tread (safety belts or cap plies).

- **Mixing Process**

Steel belted radial tires incorporate as many as ten different ingredients with the rubber compounds. These compounds include antioxidants, antiozonants, curing agents, elastomers, sulfur reinforcing agents, cobalt, magnesium oxide, rubber polymers, calcium carbonate, zinc oxide, carbon black, and processing materials. The compounds are prepared by mechanically mixing in a banbury mixer to mechanically break down the rubber in an attempt to obtain a uniformly homogenous mass which is subsequently formed into slabs of rubber that are extruded or calendered for use in tire building.

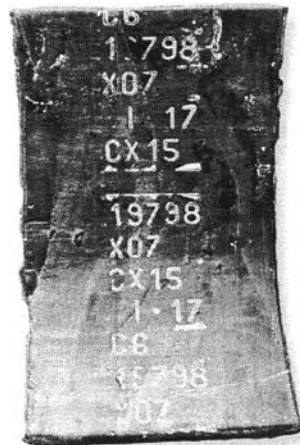


Figure A.1 Slab of rubber from Mixing Process

- **Components Preparation Process**

Each component will be made from several types of machine.

Extrusion Machine:

Some tire components are formed by extrusion of uncured rubber, including tread and sidewall components. Extruders are both hot and cold fed systems. Typically, extruders are barrel shaped. The material

is fed into the barrel and the mixed compound is pushed forward by a screw mechanism.

Tire tread incorporates several special rubber compounds which are simultaneously extruded to provide the appropriated dimensions for the specific tire. Once the tread assembly has been extruded it is coated with a rubber compound adhesive (cement). It is then cut into the appropriate length for tire building.

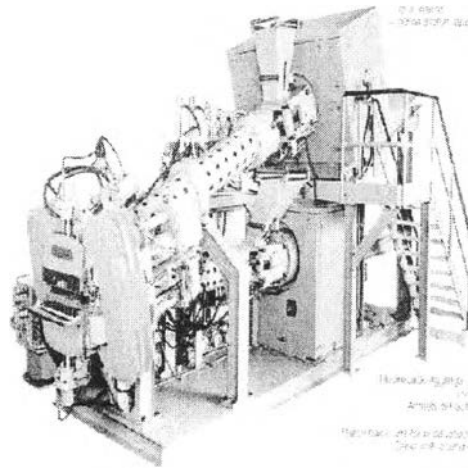


Figure A.2 Extrusion Machine

Calendering Machine:

In the calendaring process fabric cords and steel cords are coated with rubber stock. The body plies and reinforcing strips incorporate polyester cord that is coated in an adhesive liquid. The cord is passed between large heated rolls of a calendaring machine. A woven fabric is similarly prepared and calendered for the anti-chafing strips. Since rubber will not adhere to bare steel, the steel cord wires for the steel belts are coated with a very thin layer of brass. These coated, rubber encased steel cords (multi-strand cables) become the steel belts.

The brass coated steel wire is usually purchased from outside vendors and shipped to the tire manufacturer in sealed containers to prevent moisture contamination. When received by the manufacturer the wires should be stored in a temperature and humidity controlled environment until they are coated with skim stock rubber in the calendar. It is critical that belt wire not be exposed to moisture as it is susceptible to corrosion during the manufacturing process, which leads to a breakdown in adhesion.

When the wires are removed from the shipping container they are placed on roller apparatus in the creel room where temperature and humidity should be controlled and continually monitored. The wire then passes from the creel room through the open plant to the calendar. The

distance from the creel room to the calendar varies among manufacturers ranging from 20 to 60 feet. The area of the plant between the creel room and calendar is not humidity and temperature controlled so that there is a potential for moisture to accumulate on the bare wire before it is encapsulated in rubber.

This problem is exacerbated by slowdowns, temporary shutdowns humidity spikes, and failure to adequately control temperature and humidity within the creel room. Once the belt wire becomes contaminated with moisture, it becomes more difficult to obtain proper adhesion of the rubber to the brass-coated wire. The strongest possible bond between the rubber and the belt wire is critical in the construction of steel belted radial tires.

The steel wire passes from the creel room on rollers through aligning combs into the calendar where the wires are coated with a thin sheet of skim stock rubber. The rubber should also penetrate the steel cords for maximum adhesion. Both the polyester cords and steel cords are cut at specified angles and widths for use in tire building.

Beside of fabric cords and steel cords, rubber sheet called inner liner is also processed in calendaring machine. The inner liner is a critical component of modern tires. In steel belted radial tubeless tires, the inner liner is the substitute for the tube used in the older style tube tires. It is formulated to provide the least amount of air permeability possible while obtaining adhesion to the body plies. Inner liners are calendered into thin sheets of specified thicknesses and then cut to appropriate widths for use in tire construction.

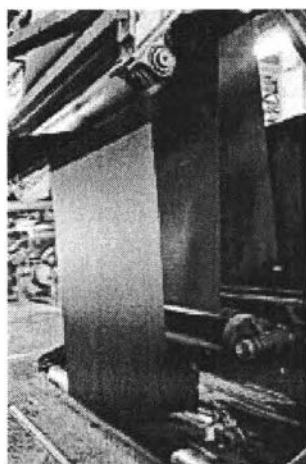


Figure A.3 Calendaring Process

Bead winding Machine:

Bead wire configurations fall into four primary categories: 0.037 weftless, 0.050 weftless, 0.050 single strand, and cable beads. Like belt wire, bead wire is generally purchased from outside vendors and shipped in hermetically sealed containers to prevent corrosion from moisture prior to manufacturing. The bead wire is plated with brass like the belt wire to provide high adhesion to the insulating rubber. Insulating rubber is usually pressed into and around the bead when it is drawn through an extruding die. Bead chaffer, which is rubber reinforcement around the bead wire, is also placed in the area of the beads to give strength and resilience during tire mounting.

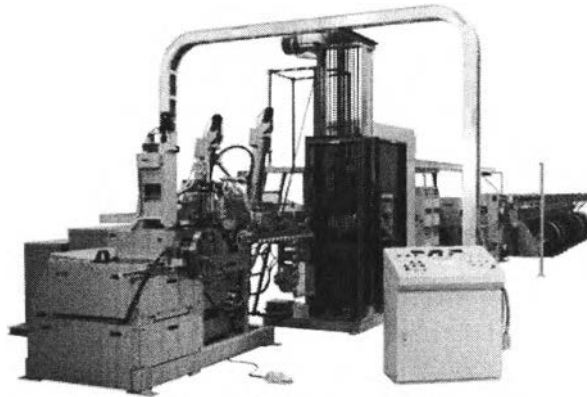


Figure A.4 Bead Winding Machine

Cutting Machine:

To cut skimmed rubber textile into proper dimension

Complexing Machine:

To complex two (or more) components in one piece in order to reduce work load in assembly process

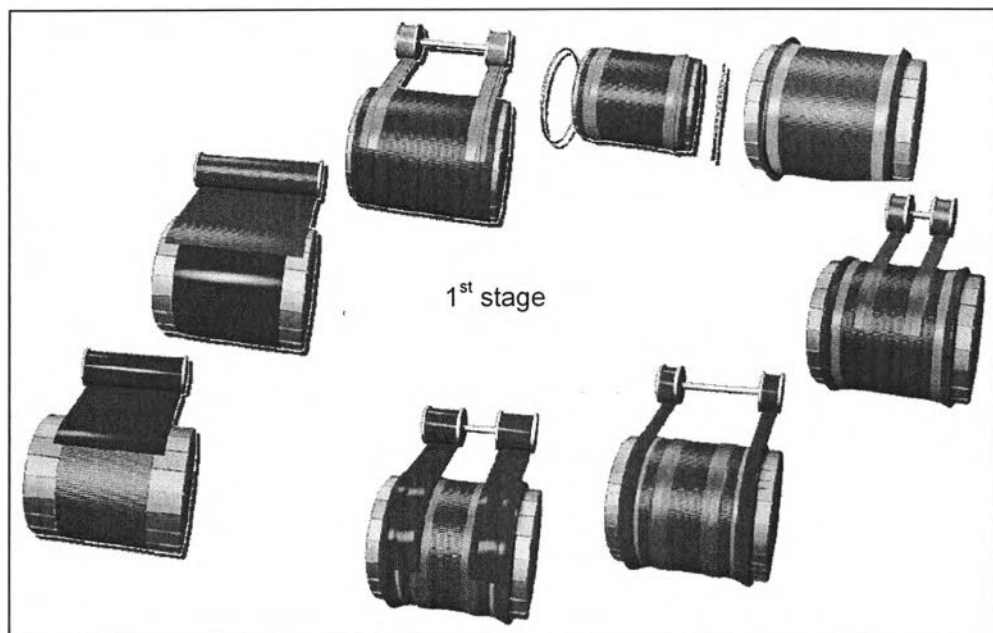
▪ **Tire Building Process**

It is important to note that most tire companies now operate on 12 hour shifts with tire builders bonuses based on the number of tires they produce over a set minimum requirement. Most steel belted radial are assembled by hand. The first stage builder constructs the tire on a cylindrical rotating drum. In the first stage of tire building process, the inner liner, body plies, beads, bead reinforcing strips and sidewalls are assembled by the first stage tire builder. During second stage tire building, the steel belts and tread are applied. The tire components, known as green tire components, are held together mechanically by their tack or stickiness. Prior to assembly the body plies and steel tread components are stored in large rolls. Prior to the components being transferred to the building machines they are often stored in this rolled configuration. Woven fabric liners are placed between the layers of the rolled material to prevent the components from sticking together.

If the rolls of stored material are not promptly utilized, they are lost their tacky quality. This makes it difficult, if not impossible, for the components to properly adhere together before vulcanization. In the latter stages of degradation, sulfur can be visualized on the surface of the components as a white or grayish layer which is called sulfur blooming.

Appropriate building practices require that components which have lost their tackiness, especially components with sulfur bloom, be scrapped. Most manufacturers, however, allow their tire builders to utilize petroleum solvents to freshen belt material or body plies that have lost their tackiness or which demonstrate sulfur bloom. Use of the petroleum solvent masks the sulfur, can cause pockets of trapped gas between components, and can allow the uncured components to move so that the precise alignment necessary for steel belts is compromised.

All the components will be assembled on tire building machine, which is normally separated into 2 different stages. Tire built on 1<sup>st</sup> stage machine is named "Carcass". Tire built on 2<sup>nd</sup> stage machine, before curing is named "Bandage".





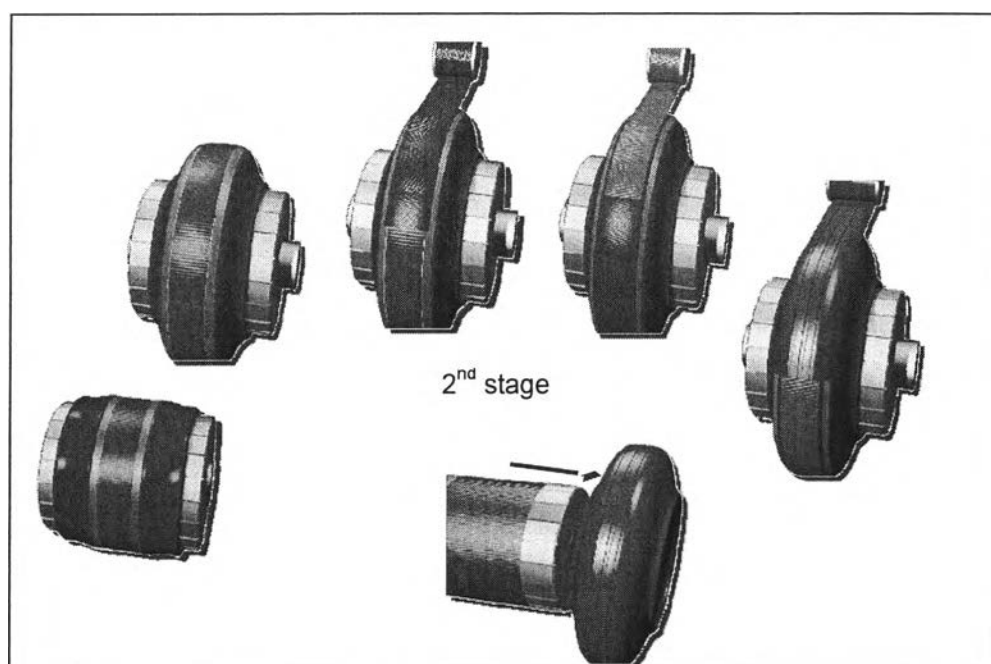


Figure A.5 Tire Building Process, 1<sup>st</sup> and 2<sup>nd</sup> stage

#### ▪ Curing Process

Subsequent to second stage, the green tire (Bandage) is transferred for vulcanization. The tire is coated with a liquid to ensure that it will not stick to the mold. In the mold the green tire is placed over an inflatable rubber bladder. Typically, the vulcanization machine is a two piece metal mold. The bladder forces the tire against the mold, forming the sidewall patterns and tread pattern. The molding is accomplished through the use of steam pressure or hot water inside of the bladder.

The rubber components of the tire are vulcanized by steam generated heat in the mold and bladder at pressure as high as 400 psi and temperatures of approximately 200° for approximately ten minutes. This heat results in chemical and physical changes in the rubber compounds. At the molecular level, profound chemical changes occur during vulcanization. The green tire rubber components are transformed from plastic consistency to the consistency found in a finished tire. The vulcanization process chemically and physically links the various components, forming what should be an inseparable bond. The shorter rubber molecules are linked to the long polymer chain linked molecules.

When the molecules in the various components properly bond, all interfacing surfaces are obliterated forming the finished green tire. Thus, any liner pattern marks from the fabric liner used during storage should be totally obliterated in a properly cured tire. One should never see liner pattern marks on a tire that has been properly cured (vulcanized).

Manufacturers use various time periods for the vulcanization process. In an effort to reduce the time required for the manufacture of a tire, manufacturers are continually attempting to reduce the vulcanizing time.

One method that is utilized is radiation of components prior to vulcanization. It should be noted that under-vulcanization will result in a lack of adhesion of the components. One indication of this lack of adhesion in a failed tire can be pattern liner marks. As a result of vulcanization, the rubber becomes essentially insoluble and cannot be processed by any of the means used to manipulate the green rubber during the assembly process.

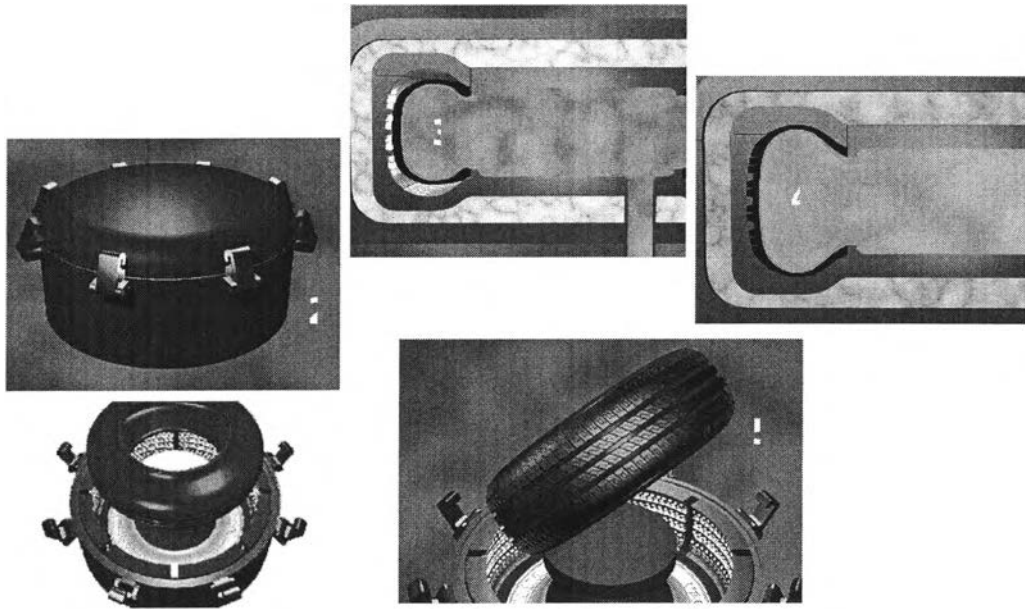


Figure A.6 Curing Process

- **Inspection Process**

All tires are supposed to be visually inspected and placed on a tire uniformity machine (TUG) before they are sent to the warehouse. Unfortunately, the visual inspection process sometimes lasts as little as fifteen seconds and on occasion is nonexistent. When an abnormality is discovered the tire is sent to classifiers who can route the tire to repair, scrap the tire, or set the tire aside for further inspection. Repairs include buffing and grinding. If a foreign object is ground out of a tire, green tire rubber is placed in the area where finished rubber has been removed. The tire is then spot vulcanized or repaired by the repairman so that the repair cannot be seen. Some manufacturers experienced air bubbles or blisters that can be visualized on the inner liner of the tire. These blisters have been repaired by poking them with an icepick-like device (awl) either through the tread, both steel belts and both body plies down to the blister and then pushing the air back out the hole produced by the icepick device, or by puncturing the blister from the inside and pressing the inner liner against the body plies with a hand stitcher. Neither of these repairs is appropriate or satisfactory and can lead to failure of the tire in the field. After final inspection/repair, tires are sent to the warehouse where tread labels are placed on the tire. They are then transferred to the retailer.



Figure A.7 Inspection Process

**APPENDIX B  
TIRE DESIGN PROCESS**

## TIRE DESIGN PROCESS

The objective of this chapter is to give you the idea what the tire design process is all about.

Tire design process is just one activities of tire development process, as shown in Figure B.1.

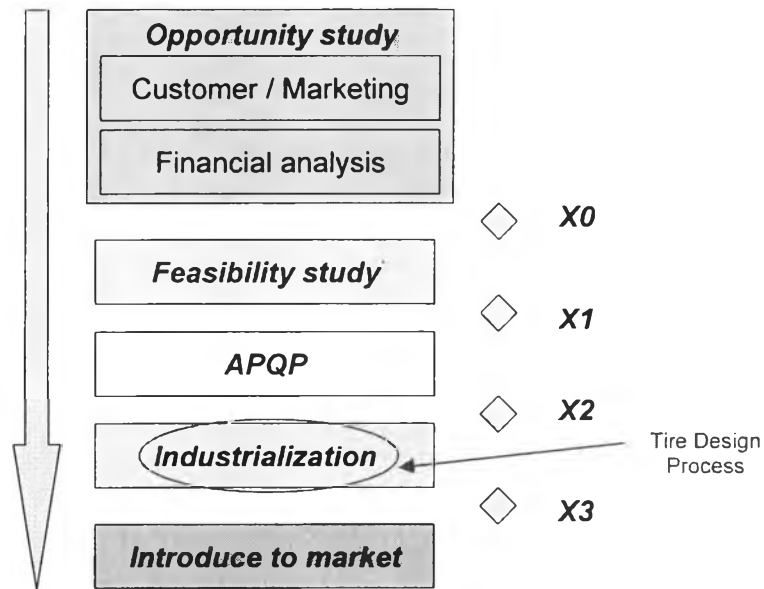


Figure B.1 Tire Development Process

### Tire development process

Tire development process consists of the major 4 stages with 4 milestones as following:

1. Opportunity study – X0  
This stage intends to analyze the financial aspect of a purposed project. Usually, local marketing will perform a marketing study based on customer requirements, and financial analysis of a project before proposing to the product steering committee for considering and approving. If a project got approval from the committee, we pass the 1<sup>st</sup> milestone – X0.
2. Feasibility study – X1  
This stage intends to propose the tire model and all the technical parameters according to the customer requirements. Tire designer in technology group will propose to a manufacturing site the tire model and all the technical parameters. If the result from feasibility study in manufacturing is “feasible”, we pass the 2<sup>nd</sup> milestone – X1.
3. Advanced Product Quality Planning (APQP) / Industrialization – X2 / X3

This stage intends to develop and follow-up solutions during APQP and industrialization process. For better understanding, industrialization process consists of “Prototype”, “Pre-launch”, and “Mass production”. If we got approval to finish “Prototype” and “Pre-launch”, we pass the next milestones X2 and X3 respectively.

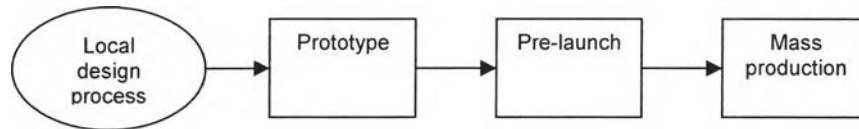


Figure B.2 Industrialization process

#### 4. Introduce to market

After passing the 4 major milestones, a project is then finished. Tire can be sold to the market according to the demand. Financial aspect will be reviewed after product launching around 1 year.

### Tire design process

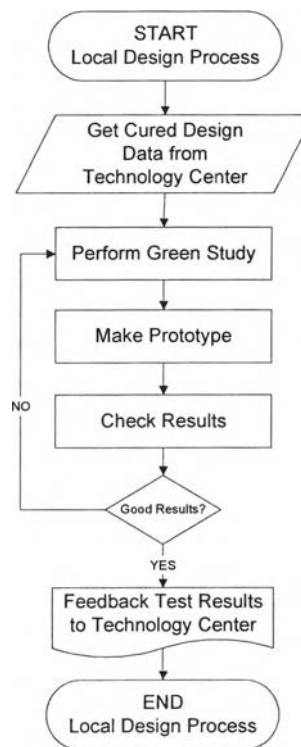


Figure B.3 Tire design process

After passing X1 milestone, local designer will get after cured design and concerned technical data, such as materials, definitions, quantity of test tire, etc from tire designer in order to perform the local design process or “green study” according to local process and its capability.

According to the Figure B.3, “green study” of each industrialization stage (Prototype or Pre-launch) means analyzing and designing “green component”, and then make trial test(s) until the results pass the criteria.

### **Green study**

The green study consists of 6 steps as following:

1. Drum width calculation
2. Belt drum development calculation
3. PKX design
4. Component design
5. Curing bladder calculation
6. Cure law request

**APPENDIX C**  
**SOURCE CODE OF APPLICATION PROGRAM**



## SOURCE CODE OF APPLICATION PROGRAM

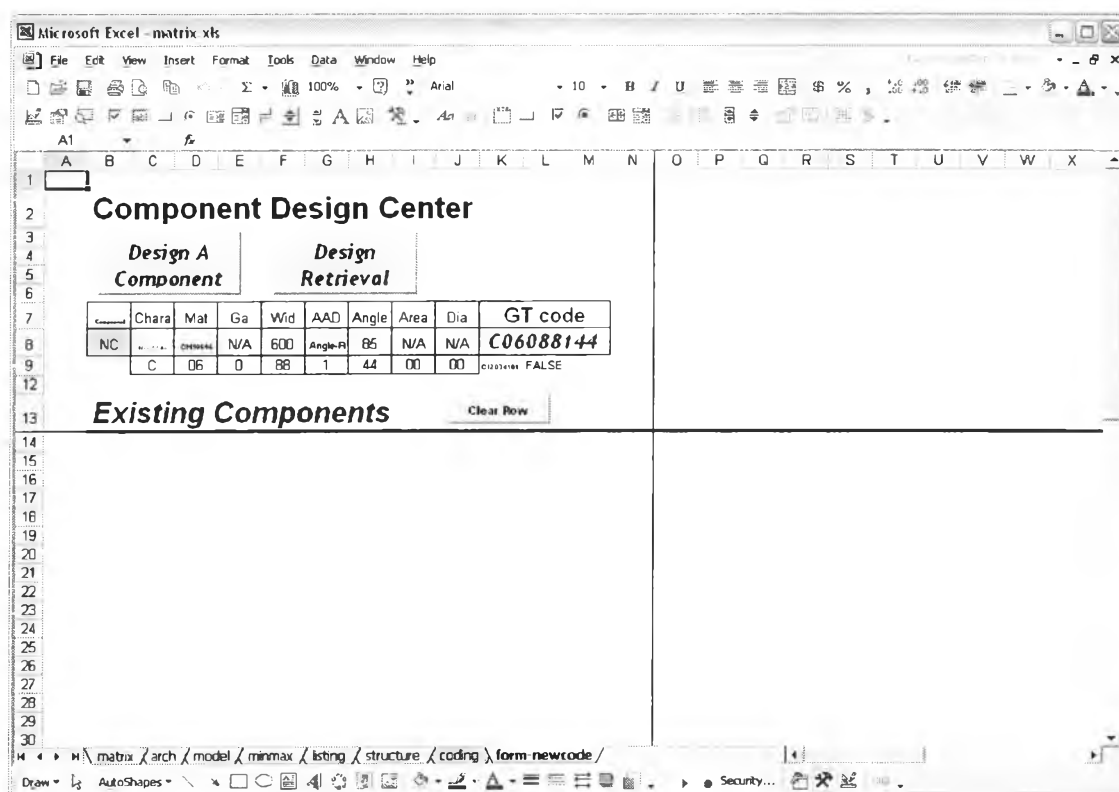


Figure B.1 Screen "Component Design Center"

### 1. Design A Component

```
Private Sub ComboBox1_Change()
Dim column, Name, Noapp, Area, Diam As String
Noapp = "N/A"
Angler = "Angle-R"
Area = "Area"
Diam = "Diameter"
```

```
' Add Material based on its characteristic
```

```
Select Case ComboBox1.Text
```

```
Case "GI"
```

```
column = "g"
```

```
ComboBox3.Value = Noapp
```

```
TextBox3.Value = Noapp
```

```
TextBox4.Value = Noapp
```

```
TextBox5.Value = Noapp
```

```
Case "RIC"
```

```
column = "g"
```

```
ComboBox3.Value = Noapp
```

```
TextBox3.Value = Noapp
```

```
TextBox4.Value = Noapp
```

```
TextBox5.Value = Noapp
```

```
Case "GSK"
```

```
column = "g"
```

```
ComboBox3.Value = Noapp
```

```
TextBox3.Value = Noapp
```

```
TextBox4.Value = Noapp
```

```
TextBox5.Value = Noapp
```

```
Case "RFI"
```

```
column = "g"
```

```
ComboBox3.Value = Noapp
```

```
TextBox3.Value = Noapp
```

```
TextBox4.Value = Noapp
```

```
TextBox5.Value = Noapp
```

```
Case "PS"
  column = "g"
  ComboBox3.Value = Noapp
  TextBox3.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "GRL"
  column = "g"
  ComboBox3.Value = Noapp
  TextBox3.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "GBS"
  column = "g"
  ComboBox3.Value = Noapp
  TextBox3.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "BT"
  column = "g"
  TextBox1.Value = Noapp
  ComboBox3.Value = Area
  TextBox3.Value = Noapp
  TextBox5.Value = Noapp
Case "PT"
  column = "g"
  TextBox1.Value = Noapp
  ComboBox3.Value = Area
  TextBox3.Value = Noapp
  TextBox5.Value = Noapp
Case "FE"
  column = "g"
  TextBox1.Value = Noapp
  ComboBox3.Value = Area
  TextBox3.Value = Noapp
  TextBox5.Value = Noapp
Case "KM"
  column = "g"
  TextBox1.Value = Noapp
  ComboBox3.Value = Area
  TextBox3.Value = Noapp
  TextBox5.Value = Noapp
Case "NC"
  column = "j"
  TextBox1.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "LI"
  column = "j"
  TextBox1.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "LP"
  column = "j"
  TextBox1.Value = Noapp
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "NSF"
  column = "j"
  TextBox1.Value = Noapp
  ComboBox3.Value = Angler
  TextBox3.Value = 0
  TextBox4.Value = Noapp
  TextBox5.Value = Noapp
Case "TP"
  column = "j"
  TextBox1.Value = Noapp
  TextBox2.Value = Noapp
  ComboBox3.Value = Diam
  TextBox3.Value = Noapp
  TextBox4.Value = Noapp
Case "NST"
  column = "j"
  TextBox1.Value = Noapp
  TextBox4.Value = Noapp
```

```

    TextBox5.Value = Noapp
    Case "[New]"
        column = "a"
    End Select
    ComboBox2.Clear
    Row = 11
    Do While Sheets("coding").Range(column & Row).Value <> ""
        Name = Sheets("coding").Range(column & Row).Value
        ComboBox2.AddItem Name
        Row = Row + 1
    Loop

End Sub

Private Sub Userform_activate()
    Dim Name As String
    Dim Row As Integer

    ' Add List of components
    Row = 11
    Do While Sheets("coding").Range("B" & Row).Value <> ""
        Name = Sheets("coding").Range("B" & Row).Value
        ComboBox1.AddItem Name
        Row = Row + 1
    Loop

    ' Add List of AAD
    Row = 11
    Do While Sheets("coding").Range("Y" & Row).Value <> ""
        Name = Sheets("coding").Range("Y" & Row).Value
        ComboBox3.AddItem Name
        Row = Row + 1
    Loop

End Sub

Private Sub commandbutton1_click()

    ' GT Coding for new component
    Row = 8

    Sheets("form-newcode").Range("b" & Row).Value = ComboBox1.Text
    Sheets("form-newcode").Range("c" & Row).Value = "=VLOOKUP(b8, 'coding'!B:D,3,0)"
    Sheets("form-newcode").Range("d" & Row).Value = ComboBox2.Text
    Sheets("form-newcode").Range("e" & Row).Value = TextBox1.Text
    Sheets("form-newcode").Range("f" & Row).Value = TextBox2.Text
    Sheets("form-newcode").Range("g" & Row).Value = ComboBox3.Text
    Sheets("form-newcode").Range("h" & Row).Value = TextBox3.Text
    Sheets("form-newcode").Range("i" & Row).Value = TextBox4.Text
    Sheets("form-newcode").Range("j" & Row).Value = TextBox5.Text

End Sub

```

## 2. Design Retrieval

```

Private Sub commandbutton1_click()
    Dim Headst, Rowbase, Dbcountrow, Dbendrow, Dbsearchcol As Integer
    Dim Charac As Variant

    'Define variables
    Headst = 3
    Dbsheetname1 = "CX1"
    Dbstartrow = 4
    Dbsearchcol = 15
    Listrow = 11
    Rowpas = 16
    Charac = Workbooks("matrix.xls").Sheets("form-newcode").Range("C8")

    'Open file dbase
    ChDir "D:\Projects\Standardization"
    Workbooks.Open Filename:= _
        "D:\Projects\Standardization\stp-standardization.xls", _
        UpdateLinks:=0
    Sheets("CX1").Select
    Windows("stp-standardization.xls").Activate

```

```

'Sheets("CX1").Select

'Define available row of dbase to search
Dbcountrow = 0
j = Dbstartrow
Do
    Dbcountrow = Dbcountrow + 1
    j = j + 1
Loop Until Worksheets(Dbsheetname1).Cells(j, Dbsearchcol) = ""
Dbendrow = Dbstartrow + Dbcountrow - 1

'Retrieve each existing Spec and GT code to check one by one
'Select case:
    Select Case Charac

'1. Rubber-Flat
    Case "Rubber-Flat"

        'GP1
        Dim stco1, edco1, stcoli1, edcoli1 As String
        stco1 = "I"
        edco1 = "AE"
        chro = 11
        stcoli1 = "B"
        edcoli1 = "X"
        'Copy Head for Sheet "CX1"
        Windows("stp-standardization.xls").Activate
        Sheets("CX1").Select
        Range(stco1 & Headst & ":" & edco1 & Headst).Select
        Selection.Copy
        Windows("matrix.xls").Activate
        Range("B15").Select
        Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
            :=False, Transpose:=False
        For Rowbase = Dbstartrow To Dbendrow
        Windows("stp-standardization.xls").Activate
        Sheets("CX1").Select
        Range(stco1 & Rowbase & ":" & edco1 & Rowbase).Select
        Selection.Copy
        Windows("matrix.xls").Activate
        Range("B11").Select
        Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
            :=False, Transpose:=False
        Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("H11")
        If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
            Windows("matrix.xls").Activate
            Sheets("form-newcode").Select
            Range(stcoli1 & chro & ":" & edcoli1 & chro).Select
            Selection.Copy
            Range("B" & Rowpas).Select
            Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
                :=False, Transpose:=False
            Rowpas = Rowpas + 1
        End If
        Next Rowbase

        'GP2
        For Rowbase = Dbstartrow To Dbendrow
        Windows("stp-standardization.xls").Activate
        Sheets("CX1").Select
        Range(stco1 & Rowbase & ":" & edco1 & Rowbase).Select
        Selection.Copy
        Windows("matrix.xls").Activate
        Range("B11").Select
        Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
            :=False, Transpose:=False
        Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("L11")
        If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
            Windows("matrix.xls").Activate
            Sheets("form-newcode").Select
            Range(stcoli1 & chro & ":" & edcoli1 & chro).Select
            Selection.Copy
            Range("B" & Rowpas).Select
            Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
                :=False, Transpose:=False
        End If
        Next Rowbase
    End Case
End Select

```

```

    Rowpas = Rowpas + 1
End If
Next Rowbase

'RIC
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX1").Select
Range(stco1 & Rowbase & ":" & edco1 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("P11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli1 & chro & ":" & edcoli1 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'RFI
Dim stco2, edco2, stcoli2, edcoli2 As String
stco2 = "I"
edco2 = "AR"
stcoli2 = "B"
edcoli2 = "AK"
chro = 11
'Copy Head for Sheet "CX2"
Windows("stp-standardization.xls").Activate
Sheets("CX2").Select
Range(stco2 & Headst & ":" & edco2 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX2").Select
Range(stco2 & Rowbase & ":" & edco2 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("I11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli2 & chro & ":" & edcoli2 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'PS
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX2").Select
Range(stco2 & Rowbase & ":" & edco2 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _

```

```

:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("X11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli2 & chro & ":" & edcoli2 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowdbase

'GRL
For Rowdbase = Dbstartrow To Dbendrow
    Windows("stp-standardization.xls").Activate
    Sheets("CX2").Select
    Range(stco2 & Rowdbase & ":" & edco2 & Rowdbase).Select
    Selection.Copy
    Windows("matrix.xls").Activate
    Range("B11").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("AD11")
    If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
        Windows("matrix.xls").Activate
        Sheets("form-newcode").Select
        Range(stcoli2 & chro & ":" & edcoli2 & chro).Select
        Selection.Copy
        Range("B" & Rowpas).Select
        Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
            :=False, Transpose:=False
        Rowpas = Rowpas + 1
    End If
Next Rowdbase

'GBS B81
Dim stco5, edco5, stcoli5, edcoli5 As String
stco5 = ""
edco5 = "AK"
stcoli5 = "B"
edcoli5 = "AD"
chro = 11
'Copy Head for Sheet "CX5"
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Headst & ":" & edco5 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowdbase = Dbstartrow To Dbendrow
    Windows("stp-standardization.xls").Activate
    Sheets("CX5").Select
    Range(stco5 & Rowdbase & ":" & edco5 & Rowdbase).Select
    Selection.Copy
    Windows("matrix.xls").Activate
    Range("B11").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
    Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("P11")
    If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
        Windows("matrix.xls").Activate
        Sheets("form-newcode").Select
        Range(stcoli5 & chro & ":" & edcoli5 & chro).Select
        Selection.Copy
        Range("B" & Rowpas).Select
        Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
            :=False, Transpose:=False
        Rowpas = Rowpas + 1
    End If
Next Rowdbase

```

```

'GBS B74
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Rowbase & "." & edco5 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("T11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli5 & chro & "." & edcoli5 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'GBS B75
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Rowbase & "." & edco5 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("X11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli5 & chro & "." & edcoli5 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'GSK
Dim stco6, edco6, stcoli6, edcoli6 As String
stco6 = "I"
edco6 = "AA"
stcoli6 = "B"
edcoli6 = "T"
chro = 11
'Copy Head for Sheet "CX6"
Windows("stp-standardization.xls").Activate
Sheets("CX6").Select
Range(stco6 & Headst & "." & edco6 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX6").Select
Range(stco6 & Rowbase & "." & edco6 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("H11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then

```

```

Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli6 & chro & ":" & edcoli6 & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowbase

'2. Rubber-Profile
Case "Rubber-Profile"

'BT
Dim stco3, edco3, stcoli3, edcoli3 As String
stco3 = "I"
edco3 = "AE"
stcoli3 = "B"
edcoli3 = "X"
chro = 11
'Copy Head for Sheet "CX3"
Windows("stp-standardization.xls").Activate
Sheets("CX3").Select
Range(stco3 & Headst & ":" & edco3 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B15").Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX3").Select
Range(stco3 & Rowbase & ":" & edco3 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("P11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli3 & chro & ":" & edcoli3 & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowbase

'PT
Dim stco4, edco4, stcoli4, edcoli4 As String
stco4 = "I"
edco4 = "U"
stcoli4 = "B"
edcoli4 = "N"
chro = 11
'Copy Head for Sheet "CX4"
Windows("stp-standardization.xls").Activate
Sheets("CX4").Select
Range(stco4 & Headst & ":" & edco4 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX4").Select
Range(stco4 & Rowbase & ":" & edco4 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate

```



```

Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("M11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli4 & chro & ":" & edcoli4 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'FE
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX4").Select
Range(stco4 & Rowbase & ":" & edco4 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("N11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli4 & chro & ":" & edcoli4 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowbase

'KM
stco6 = "I"
edco6 = "AA"
stcoli6 = "B"
edcoli6 = "T"
chro = 11
'Copy Head for Sheet "CX6"
Windows("stp-standardization.xls").Activate
Sheets("CX6").Select
Range(stco6 & Headst & ":" & edco6 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX6").Select
Range(stco6 & Rowbase & ":" & edco6 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("P11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli6 & chro & ":" & edcoli6 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
    Rowpas = Rowpas + 1
End If

```

Next Rowbase

'3. Skimmed-Fabric  
Case "Skimmed-Fabric"

```
'NC1
stco2 = "I"
edco2 = "AR"
stcoli2 = "B"
edcoli2 = "AK"
chro = 11
  'Copy Head for Sheet "CX2"
  Windows("stp-standardization.xls").Activate
  Sheets("CX2").Select
  Range(stco2 & Headst & ":" & edco2 & Headst).Select
  Selection.Copy
  Windows("matrix.xls").Activate
  Range("B15").Select
  Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
  For Rowbase = Dbstartrow To Dbendrow
  Windows("stp-standardization.xls").Activate
  Sheets("CX2").Select
  Range(stco2 & Rowbase & ":" & edco2 & Rowbase).Select
  Selection.Copy
  Windows("matrix.xls").Activate
  Range("B11").Select
  Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
  Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("M11")
  If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli2 & chro & ":" & edcoli2 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
      :=False, Transpose:=False
    Rowpas = Rowpas + 1
  End If
  Next Rowbase

'NC2
For Rowbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX2").Select
Range(stco2 & Rowbase & ":" & edco2 & Rowbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
  :=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("Q11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
  Windows("matrix.xls").Activate
  Sheets("form-newcode").Select
  Range(stcoli2 & chro & ":" & edcoli2 & chro).Select
  Selection.Copy
  Range("B" & Rowpas).Select
  Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
  Rowpas = Rowpas + 1
End If
Next Rowbase

'LI
stco3 = "I"
edco3 = "AE"
stcoli3 = "B"
edcoli3 = "X"
chro = 11
  'Copy Head for Sheet "CX3"
  Windows("stp-standardization.xls").Activate
  Sheets("CX3").Select
  Range(stco3 & Headst & ":" & edco3 & Headst).Select
```

```

Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX3").Select
Range(stco3 & Rowdbase & "." & edco3 & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("T11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli3 & chro & "." & edcoli3 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowdbase

'LP
stco1 = "I"
edco1 = "AE"
chro = 11
stcoli1 = "B"
edcoli1 = "X"
'Copy Head for Sheet "CX1"
Windows("stp-standardization.xls").Activate
Sheets("CX1").Select
Range(stco1 & Headst & "." & edco1 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX1").Select
Range(stco1 & Rowdbase & "." & edco1 & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("U11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
    Windows("matrix.xls").Activate
    Sheets("form-newcode").Select
    Range(stcoli1 & chro & "." & edcoli1 & chro).Select
    Selection.Copy
    Range("B" & Rowpas).Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Rowpas = Rowpas + 1
End If
Next Rowdbase

'NSF
Dim stco_n, edco_n, stcoli_n, edcoli_n As String
stco_n = "I"
edco_n = "R"
chro = 11
stcoli_n = "B"
edcoli_n = "K"
'Copy Head for Sheet "NAZ"
Windows("stp-standardization.xls").Activate

```

```

Sheets("NAZ").Select
Range(stco_n & Headst & ":" & edco_n & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("NAZ").Select
Range(stco_n & Rowdbase & ":" & edco_n & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("H11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli_n & chro & ":" & edcoli_n & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowdbase

4. Skimmed-Metallic
Case "Skimmed-Metallic"

'TP
stco3 = "I"
edco3 = "AE"
stcoli3 = "B"
edcoli3 = "X"
chro = 11
'Copy Head for Sheet "CX3"
Windows("stp-standardization.xls").Activate
Sheets("CX3").Select
Range(stco3 & Headst & ":" & edco3 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B15").Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX3").Select
Range(stco3 & Rowdbase & ":" & edco3 & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("K11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli3 & chro & ":" & edcoli3 & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowdbase

'NST1
stco5 = "I"
edco5 = "AK"
stcoli5 = "B"
edcoli5 = "AD"

```

```

chro = 11
'Copy Head for Sheet "CX5"
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Headst & "." & edco5 & Headst).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteAll, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Rowdbase & "." & edco5 & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("H11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli5 & chro & "." & edcoli5 & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowdbase

'NST2
For Rowdbase = Dbstartrow To Dbendrow
Windows("stp-standardization.xls").Activate
Sheets("CX5").Select
Range(stco5 & Rowdbase & "." & edco5 & Rowdbase).Select
Selection.Copy
Windows("matrix.xls").Activate
Range("B11").Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Sheets("form-newcode").Range("K9") = Sheets("form-newcode").Range("L11")
If Workbooks("matrix.xls").Sheets("form-newcode").Range("L9").Value = True Then
Windows("matrix.xls").Activate
Sheets("form-newcode").Select
Range(stcoli5 & chro & "." & edcoli5 & chro).Select
Selection.Copy
Range("B" & Rowpas).Select
Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
:=False, Transpose:=False
Rowpas = Rowpas + 1
End If
Next Rowdbase

'End select
End Select

'Close file dbase
Windows("stp-standardization.xls").Activate
ActiveWindow.Close

End Sub

```

### 3. Clear Row

```

Private Sub commandbutton1_click()
Dim i As Integer

startrow = 15
searchcol = 2
countrow = 0
j = startrow
Do

```

```

        countrow = countrow + 1
        j = j + 1
    Loop Until Worksheets("form-newcode").Cells(j, searchcol) = ""
    endrow = startrow + countrow - 1

For i = startrow To endrow
    Rows("1:1").Select
    Selection.ClearContents
    Selection.Copy
    Rows(i & ":" & i).Select
    Selection.PasteSpecial Paste:=xlPasteFormats, Operation:=xlNone, _
        SkipBlanks:=False, Transpose:=False
    Selection.ClearContents
    Rows("11:11").Select
Next i

End Sub

```

## 4. Functions

```

Function Chara(x) As String
    sheetname = "coding"
    startrow = 11
    datacol = 3
    searchcol = 4

```

```

    countrow = 0
    j = startrow
    Do
        countrow = countrow + 1
        j = j + 1
    Loop Until Worksheets(sheetname).Cells(j, searchcol) = ""
    endrow = startrow + countrow - 1

```

```

For i = startrow To endrow
    If x = Worksheets(sheetname).Cells(i, searchcol) Then
        Chara = Worksheets(sheetname).Cells(i, datacol)
        Exit For
    End If
Next i
End Function

```

```

Function mat1(x As Variant) As Integer
    sheetname = "coding"
    startrow = 11
    datacol1 = 5
    datacol2 = 6
    searchcol = 7

```

```

    countrow = 0
    j = startrow
    Do
        countrow = countrow + 1
        j = j + 1
    Loop Until Worksheets(sheetname).Cells(j, searchcol) = ""
    endrow = startrow + countrow - 1

```

```

For i = startrow To endrow
    If x = Worksheets(sheetname).Cells(i, searchcol) Then
        mat1 = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)
        Exit For
    End If
Next i
End Function

```

```

Function mat2(x As Variant) As Integer
    sheetname = "coding"
    startrow = 11
    datacol1 = 8
    datacol2 = 9
    searchcol = 10

```

```

    countrow = 0
    j = startrow
    Do

```

```

    countrow = countrow + 1
    j = j + 1
Loop Until Worksheets(sheetname).Cells(j, searchcol) = ""
endrow = startrow + countrow - 1

For i = startrow To endrow
    If x = Worksheets(sheetname).Cells(i, searchcol) Then
        mat2 = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)
        Exit For
    End If
Next i
End Function

Function ga(x As Variant) As Integer
sheetname = "coding"
startrow = 12
endrow = 19
datacol = 11
mincol = 12
maxcol = 13

For i = startrow To endrow
    If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then
        ga = Worksheets(sheetname).Cells(i, datacol)
        Exit For
    End If
Next i
End Function

Function wid(x As Variant) As Integer
sheetname = "coding"
startrow = 12
datacol1 = 14
datacol2 = 15
mincol = 16
maxcol = 17

countrow = 0
j = startrow
Do
    countrow = countrow + 1
    j = j + 1
Loop Until Worksheets(sheetname).Cells(j, mincol) = ""
endrow = startrow + countrow - 1

For i = startrow To endrow
    If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then
        wid = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)
        Exit For
    End If
Next i
End Function

Function pos(x As Variant) As Integer
sheetname = "coding"
startrow = 11
datacol = 18
searchcol = 19

countrow = 0
j = startrow
Do
    countrow = countrow + 1
    j = j + 1
Loop Until Worksheets(sheetname).Cells(j, searchcol) = ""
endrow = startrow + countrow - 1

For i = startrow To endrow
    If x = Worksheets(sheetname).Cells(i, searchcol) Then
        pos = Worksheets(sheetname).Cells(i, datacol)
        Exit For
    End If
Next i
End Function

```

Function posize(x As Variant) As Integer

sheetname = "coding"

startrow = 12

datacol1 = 20

datacol2 = 21

mincol = 22

maxcol = 23

countrow = 0

j = startrow

Do

countrow = countrow + 1

j = j + 1

Loop Until Worksheets(sheetname).Cells(j, mincol) = ""

endrow = startrow + countrow - 1

For i = startrow To endrow

If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then  
posize = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)

Exit For

End If

Next i

End Function

Function aad(x As Variant) As Integer

sheetname = "coding"

startrow = 12

datacol = 24

searchcol = 25

countrow = 0

j = startrow

Do

countrow = countrow + 1

j = j + 1

Loop Until Worksheets(sheetname).Cells(j, searchcol) = ""

endrow = startrow + countrow - 1

For i = startrow To endrow

If x = Worksheets(sheetname).Cells(i, searchcol) Then  
aad = Worksheets(sheetname).Cells(i, datacol)

Exit For

End If

Next i

End Function

Function angle(x As Variant) As Integer

sheetname = "coding"

startrow = 12

datacol1 = 26

datacol2 = 27

mincol = 28

maxcol = 29

countrow = 0

j = startrow

Do

countrow = countrow + 1

j = j + 1

Loop Until Worksheets(sheetname).Cells(j, mincol) = ""

endrow = startrow + countrow - 1

For i = startrow To endrow

If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then  
angle = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)

Exit For

End If

Next i

End Function

Function Area(x As Variant) As Integer

sheetname = "coding"

startrow = 12

datacol1 = 30

datacol2 = 31



```

mincol = 32
maxcol = 33

countrow = 0
j = startrow
Do
    countrow = countrow + 1
    j = j + 1
Loop Until Worksheets(sheetname).Cells(j, mincol) = ""
endrow = startrow + countrow - 1

For i = startrow To endrow
    If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then
        Area = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)
        Exit For
    End If
Next i
End Function

Function dia(x As Variant) As Integer
sheetname = "coding"
startrow = 12
datacol1 = 34
datacol2 = 35
mincol = 36
maxcol = 37

countrow = 0
j = startrow
Do
    countrow = countrow + 1
    j = j + 1
Loop Until Worksheets(sheetname).Cells(j, mincol) = ""
endrow = startrow + countrow - 1

For i = startrow To endrow
    If (x >= Worksheets(sheetname).Cells(i, mincol)) And (x < Worksheets(sheetname).Cells(i, maxcol)) Then
        dia = Worksheets(sheetname).Cells(i, datacol1) & Worksheets(sheetname).Cells(i, datacol2)
        Exit For
    End If
Next i
End Function

```

## BIOGRAPHY

Mr. Jatupon Thammachaisopit was born on Dec 23 '1973 in Bangkok, Thailand. He finished high school from Wat Rajbopit School in 1992, and then he graduated from King Mongkut's Institute of Technology Ladkrabang in Agricultural Engineering, Faculty of Engineering in the year 1997.

He has been working for Siam Tyre Phrapradaeng Co., Ltd. since he had graduated. The first position he started was Design Engineer, in charge of product specifications and running cards, follow up daily problems related to tire design, contact to Technical center to get necessary information and do cost reduction projects.

Now he is Industrialization manager, leading the team of 5 engineers to achieve the objective of industrialization new product (Indicators: Quality, Cost, and Timing), Daily problem (defect) solving (Indicator: Defect rate), Provide technical support to continuous improvement project team, Develop technical people to be Quality team in the production

