CHAPTER 4

SYSTEM VALIDATION

4.1 Overview

System validation is the process to "PROVE" that the controlled system meets its intended use via "DOCUMENTED" evidence and supporting processes. Usually, risk assessment is also performed during this stage in order to anticipate the proper contingency plan.

4.2 Application of C&C for Radial Tire Components

In accordance with the classification of structure of radial tire components defined in chapter 3, the application of classification and coding for radial tire components has been developed in order to enhance the following aspects:

- Ease of use
- Ease of learning
- User-friendliness
- Mistyping prevention

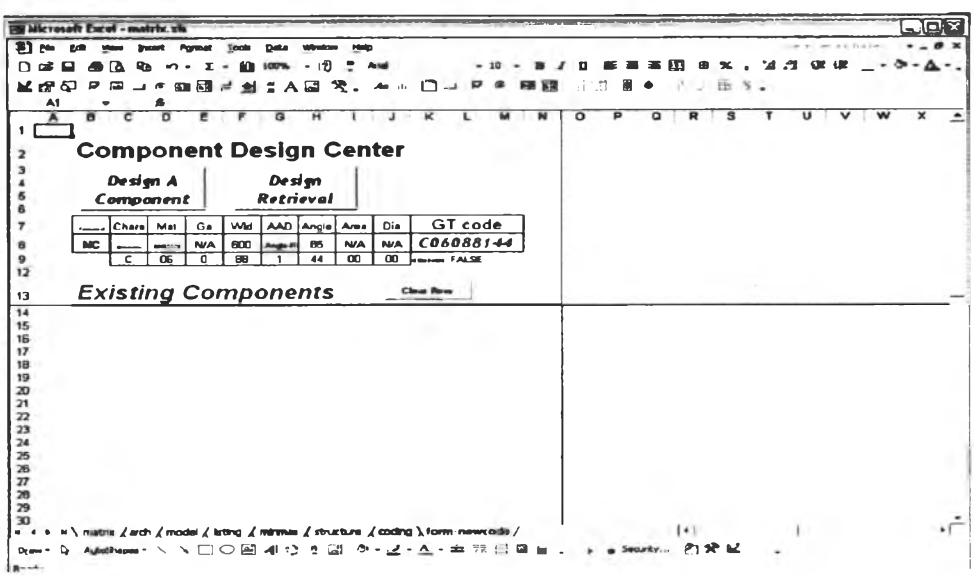

Figure 4.1 Screen shot of "Component Design Center"

How does the application works?

According to the screen shot of "Component Design Center", shown in Figure 4.1, the user just easily clicks on the button "Design A Component" when he/she would like to design a new component. The form "Design A Component" will then appear on the screen, ready to get the design parameters, as shown in Figure 4.2.

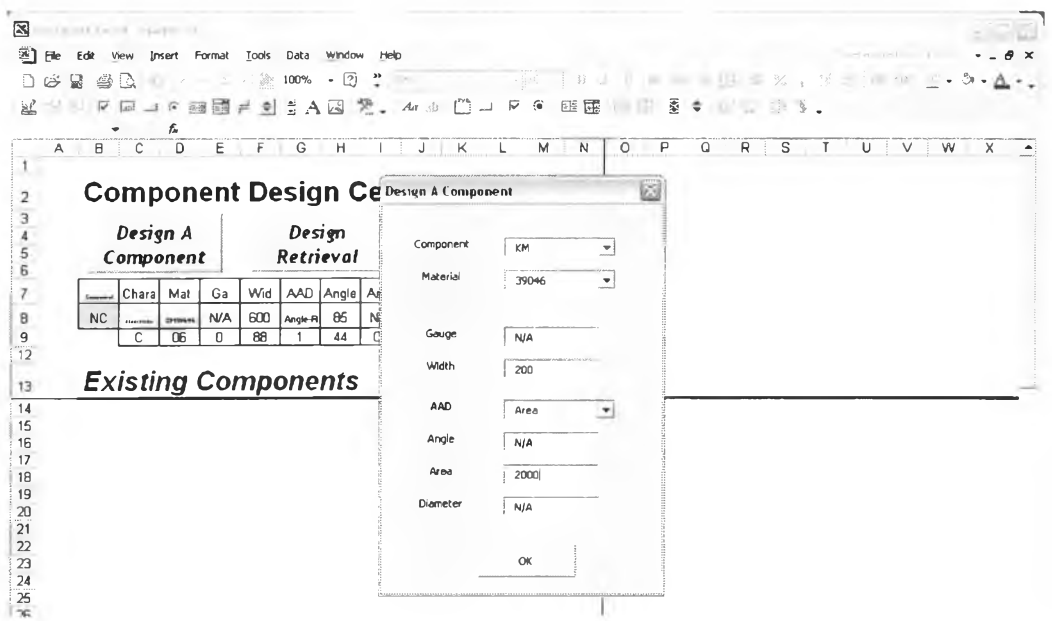

Figure 4.2 The form "Design A Component"

After finishing fill-up the concerned design parameters, and then click the button "OK" at the bottom of the form, the user will easily get the assigned code in the cell "K8", as shown in Figure 4.3.

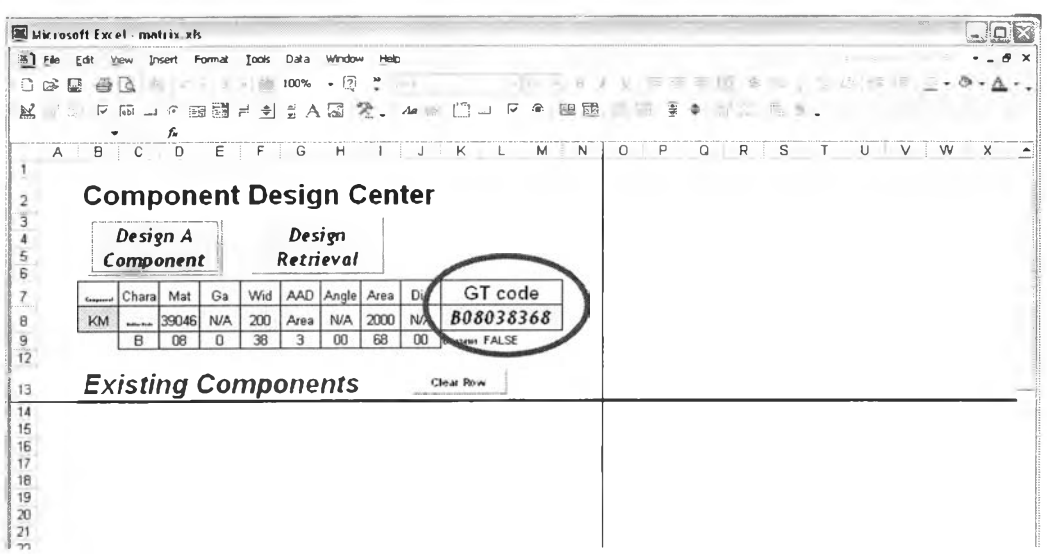

Figure 4.3 Assigned GT code result

The average timing in getting a new GT code for a component by using this application is less than 20 seconds.

4.3 Data base of Radial Tire Components

After developing the GT code structure for classification and coding, the data base of radial tire components was then developed in MS.Excel spreadsheet because, currently, tire designer is using MS.Excel for issuing a tire specification. As a result, it is very comfortable to store all the design parameter in the same application.

The GT code assigning to the data base is being done by using Visual Basic module.

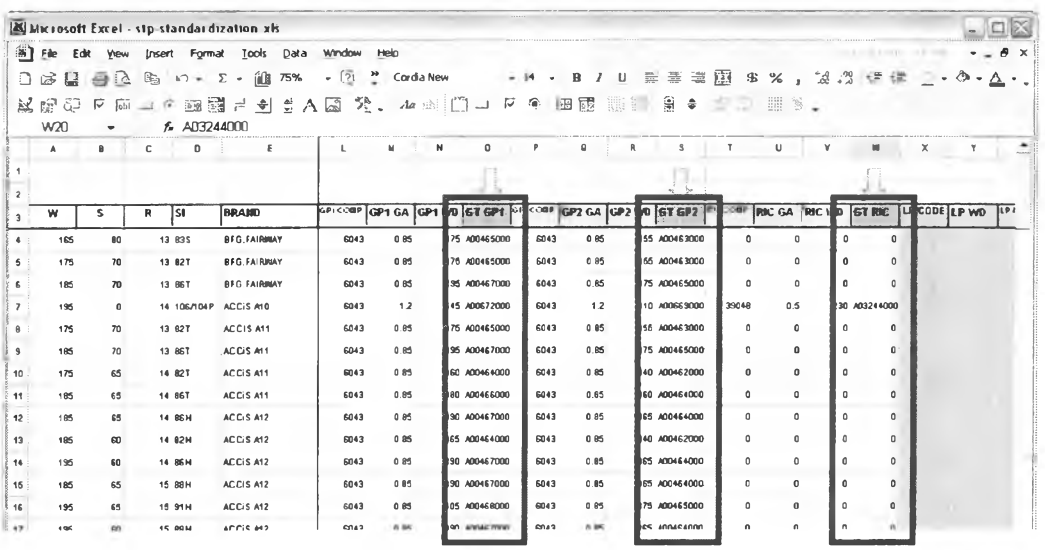

Figure 3.3 Data base for Radial Tire Components with Coding

The average timing of assigning GT code to a component in the data base is less than 40 seconds. Therefore, it takes about 12 minutes for the whole components.

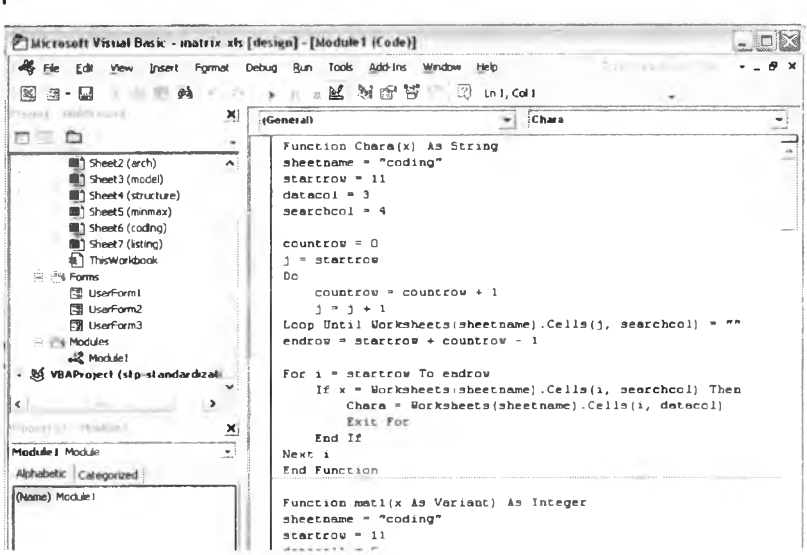

Figure 4.4 Visual Basic modules assigning GT code

4.4 Design Retrieval for Part Standardization

The next step after getting the completed data base with GT code correctly is to develop the application for "Design Retrieval", one of the well-known group technology applications, in order to support the use of existing design and standardization of components.

How does the application works?

According to the screen shot of "Component Design Center", shown in Figure 4.1, the user has to finish the process of assigning the GT code first. After that, he/she just easily clicks on the button "Design Retrieval" when he/she would like to retrieve the existing similar design. The form "Design Retrieval" will then appear on the screen, as shown in Figure 4.5.

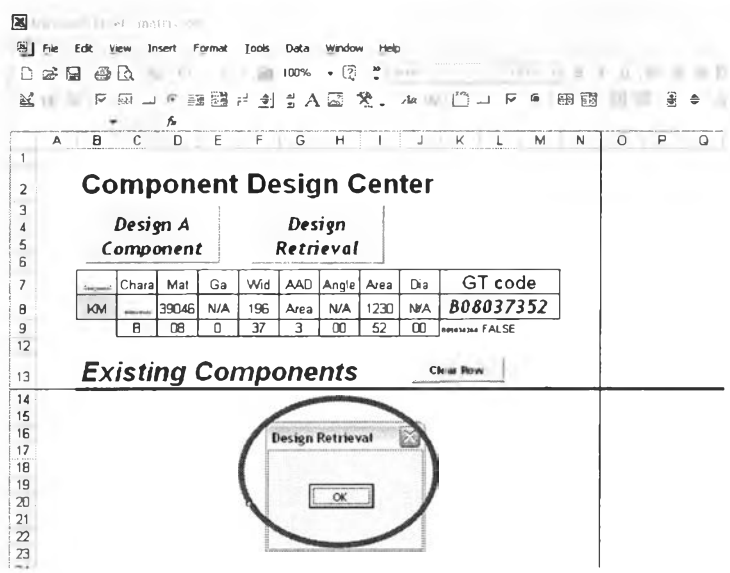

Figure 4.5 The application for Design Retrieval

As shown in Figure 4.6, after clicking the button "OK" in the form, the application will perform the following functions:

- Check the GT code of the new component
- Verify if there is the same GT code in the data base
  - If yes, copy row from the data base, then paste in the "Existing Components" area
  - If no, the user will get blank header.

The average timing of design retrieval is less than 1 minute for a component.

In the example case,

- A new component is KM, compound 39046, width 196mm., area 1230mm2.
- It takes about 40 seconds to get "7 found data", "3 different PKX" by using computer: Intel Pentium-M 1.4 GHz, RAM 512 MB.

- From the existing component we've got from design retrieval process,
  - Class "HIT", if local tire designer can select one of them without any additional modification
  - Class "Partial HIT", if local tire designer can select one of them with modification.
  - Class "MISS", if local tire designer cannot select one of them.

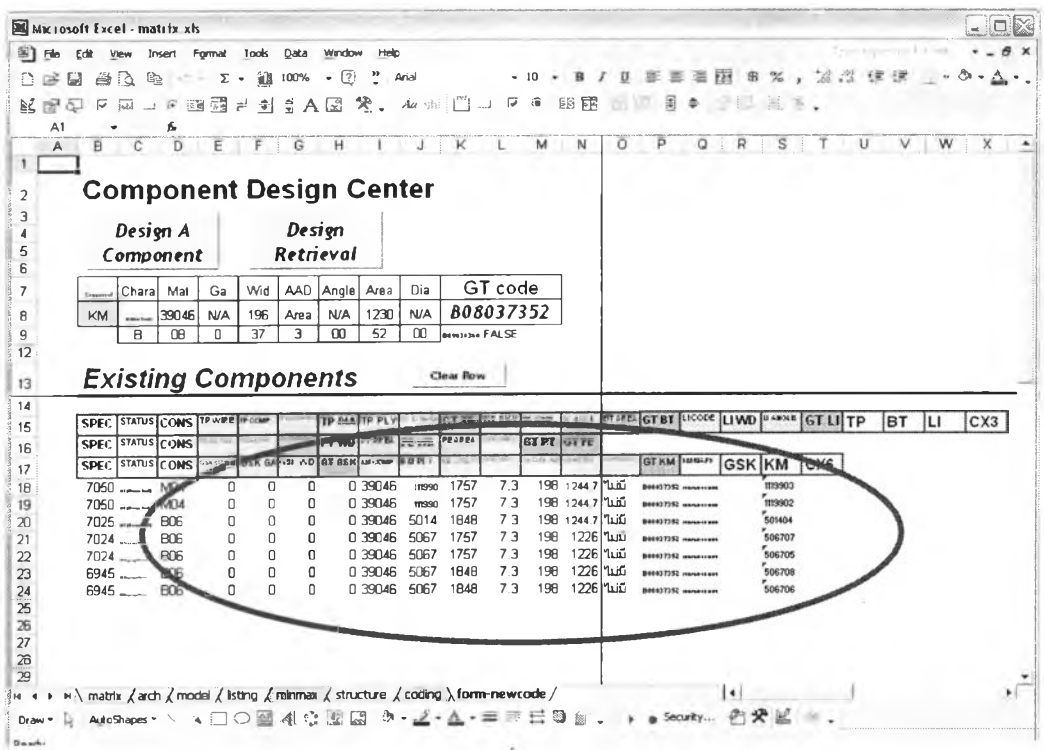

Figure 4.6 Searching Results from Design Retrieval