CHAPTER IV

CURRENT METHODS OF QUALITY CONTROL

4.1 Introduction

Now, Molex Thailand is using 8 Quality Deficiency to solve quality problem whenever customer complaint to Molex Thailand which is too late. Customers have already upset and dissatisfaction. In this chapter, it show what quality control of Molex Thailand is currently using in the factory.

4.2 8-D corrective action

These actions provide the standard manner of establishing the improvement plan for any customer complaints. Moreover, these actions are used to ensure that there are no defect parts to customers. 8-D corrective action of Molex Thailand is shown in appendix A.

4.2.1 The 8 steps of 8Ds corrective action are described as following

Step 1: D-1 Set up team responsible

Team must have one to take responsible in order to verify the effective corrective actions and keep the team going until D-8. Members of team have to have knowledge and skill which related to the problems.

Step 2: D-2 Describe the problem

Team identify the problems into quantitative data.

Step 3: D-3 Implement interim actions and verification

Define and implement interim actions so as to isolate the problems until the corrective actions are implemented. After implemented interim action, verification of the effectiveness of this interim actions have to be done.

Step 4: D-4 Define and verify root causes

Identify all potential causes of the problems and verify the root causes against the problem. Verification of the causes in term of percentage of contribution is needed to be done.

Step 5: D-5 Define and verify corrective actions

Identify all possible corrective actions and verify each action against the problem. Verification of the corrective action in term of effectiveness percentage is needed to be done.

Step 6: D-6 Implement permanent corrective actions

Define and implement the best corrective action and select on-going control to ensure the root cause is eliminated.

Step 7: D-7 Preventive action to prevent recurrence

Modify management systems, operating systems, practices and procedure to prevent recurrence all similar problems

Step 8: D-8 Congratulation team

Recognise the efforts of team

4.3 Current control chart in Molex Thailand

Figure 4.1-4.8, show the charts that Molex Thailand is currently using in the factory. Basically, Molex Thailand is using variable control chart and attribute control chart. For variable control chart, the type of control chart is shown as following

1) $\bar{X}$ - R chart 2) $\bar{X}$ - Monitoring chart

For attribute control chart, type of control chart are shown as following

1) NP chart 2) Standardised NP chart

4.3.1 Current control chart of Molex Thailand.

Basically, there are five main manufacturing sections that currently using control chart. Moreover, there are the example of what control chart is used in each section.

1. Automatic assembly section
2. Cutting section
3. Manual crimping section
4. Manual insertion section
5. Maintenance section

1 In Automatic assembly section

Molex Thailand uses variable control chart which is $\bar{X}$- R chart to control the solder tail length and terminal bent. In figure 4.1 show the chart to control solder tail length in Molex Thailand. In figure 4.1, there are two points which is almost out off upper control limit and there are two points which are almost out off lower control limit. But Molex Thailand do not investigate the causes that lead to these four points after monitoring. As a result, it might lead to the increase of customer complaints. In chapter V, FMEA technique is proposed to prevent possible problems and eliminate failure, error and problems.

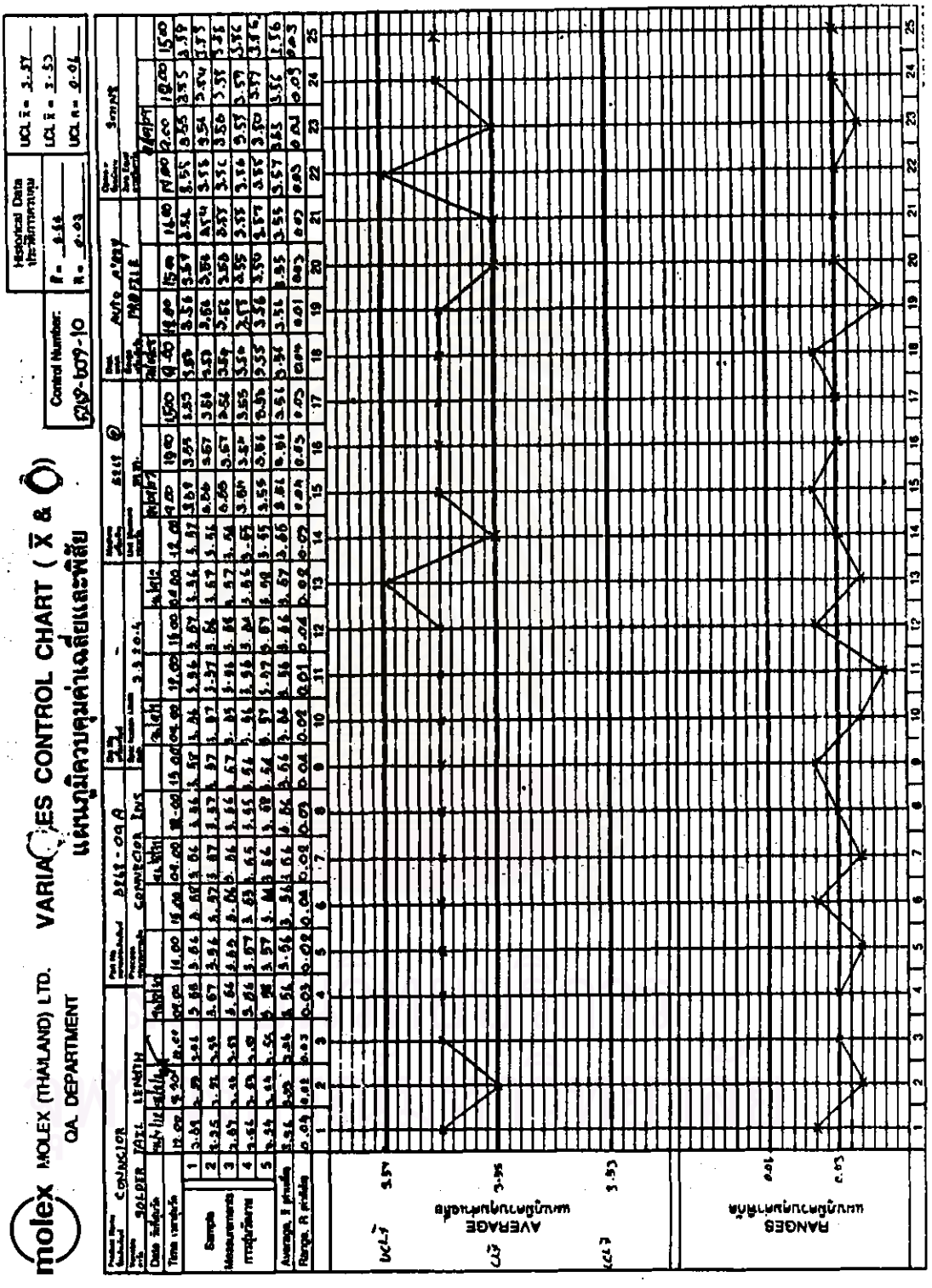

Figure 4.1- Variable control chart ($\bar{X}$- R) for solder tail length

Source: Molex Thailand, 1997

2 In cutting section

Molex Thailand uses variable control chart which is $\bar{X}$- R chart to control the quality criteria which are shown as following.

2.1 Conductors crimp height
2.2 Total length is out off specification
2.3 Strip length is out off specification

In figure 4.2 show $\bar{X}$- R chart to control conductor crimp height in cutting section. In this figure 4.2, it shows that there is one point which is obviously out off upper control limit and there are a lot of points which is almost out of both upper control limit and lower control limit as well.

In figure 4.3 show $\bar{X}$- R chart to control total length of wire in cutting section. In this figure 4.3, it shows that there is one point which is obviously out off lower control limit and there are a couple of points which is almost out off lower control limit as well.

In figure 4.4 show $\bar{X}$- R chart to control strip length of wire in cutting section. In this figure 4.4, it shows that there are two points which is out off upper control limit.

From figure 4.2-4.4, Molex Thailand do not investigate the causes of problems that lead to out off control limit after monitoring and there is no action to correct. As a result, it might lead to the increase of customer complaints. In chapter V, FMEA technique is proposed to prevent possible problems and eliminate failure, error and problems.

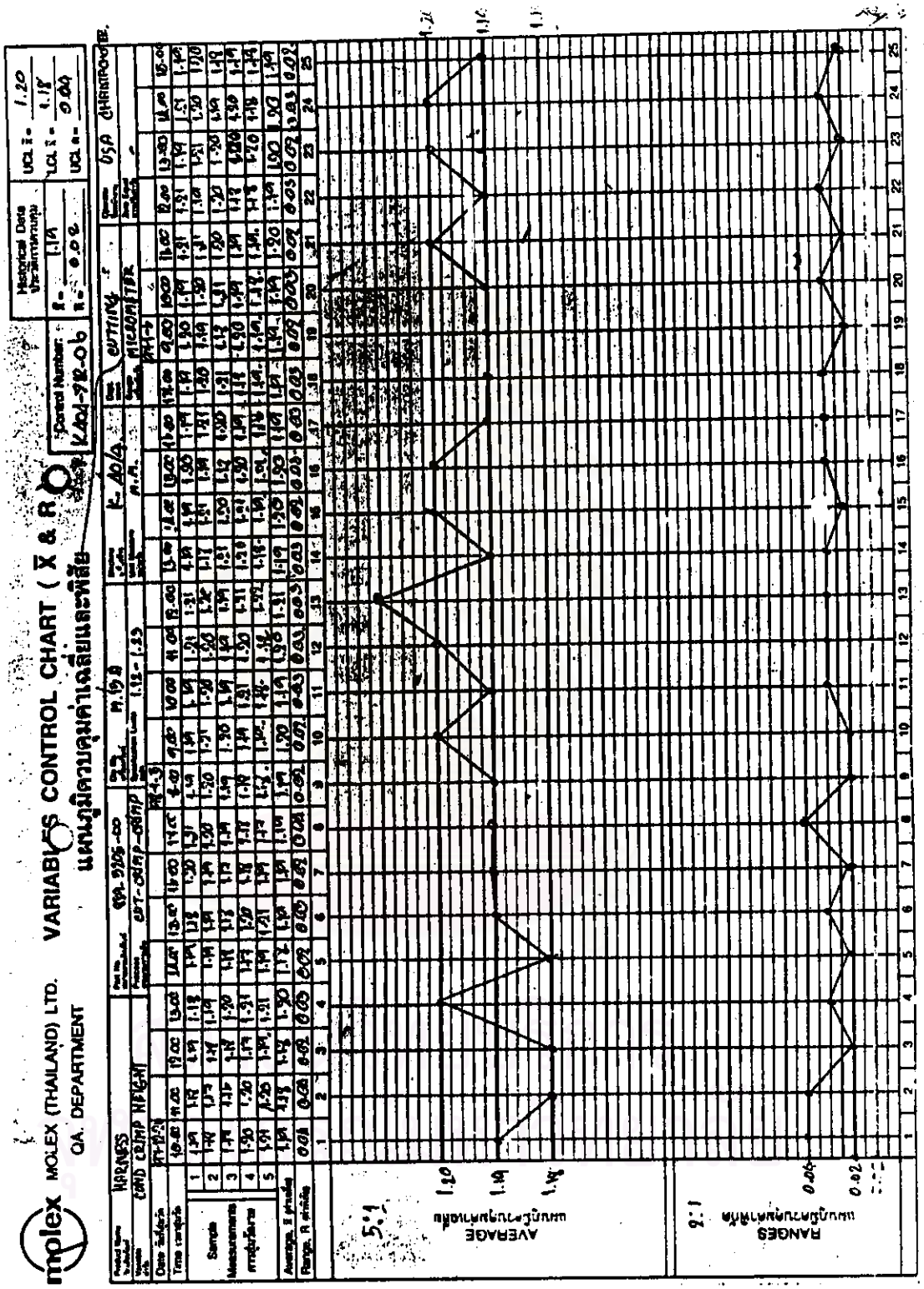

Figure 4.2- Variable control chart ($\bar{X}$- R) for conductor crimp height

Source: Molex Thailand, 1997

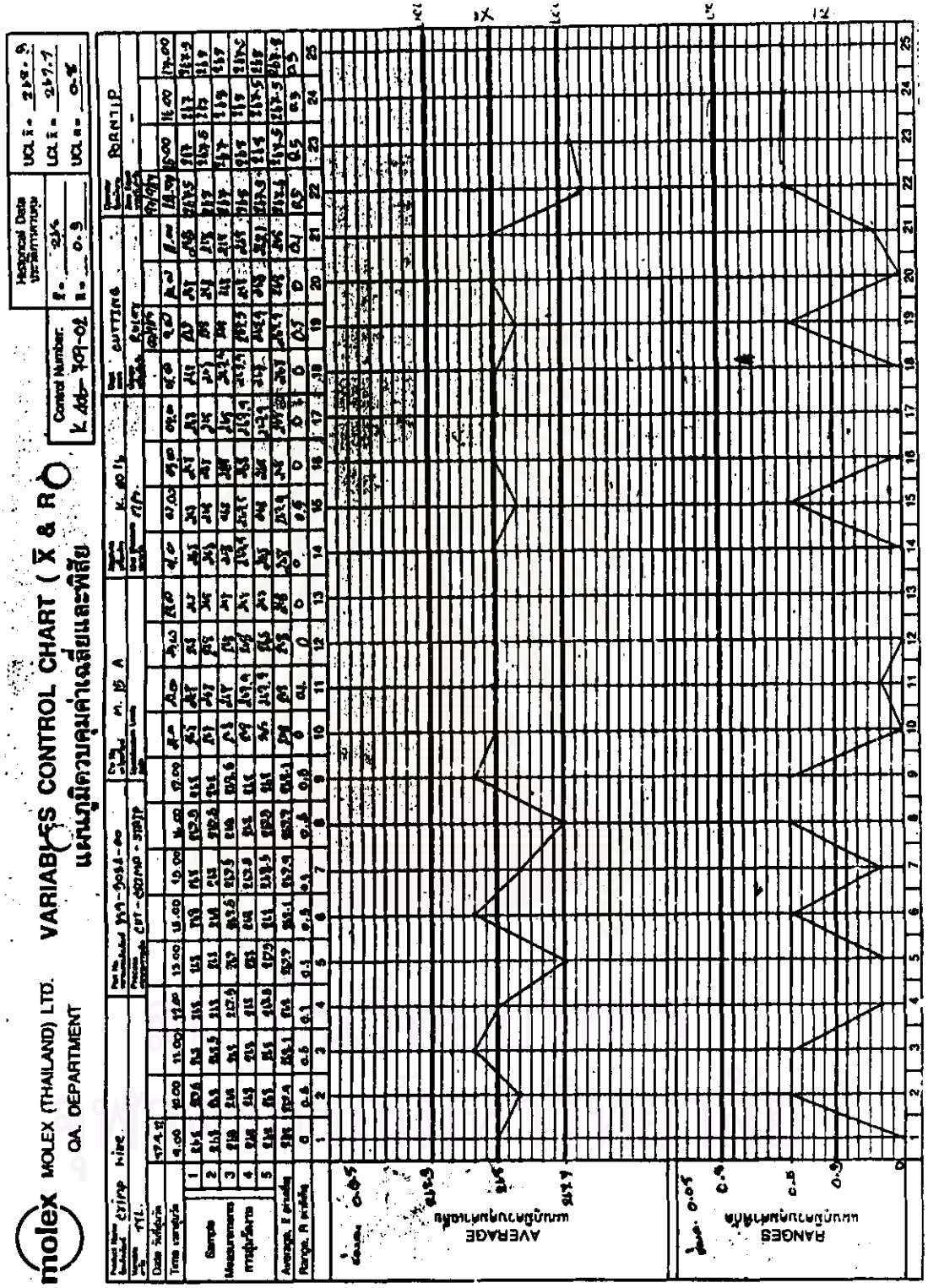

Figure 4.3- Variable control chart ($\bar{X}$- R) for total wire length

Source: Molex Thailand, 1997

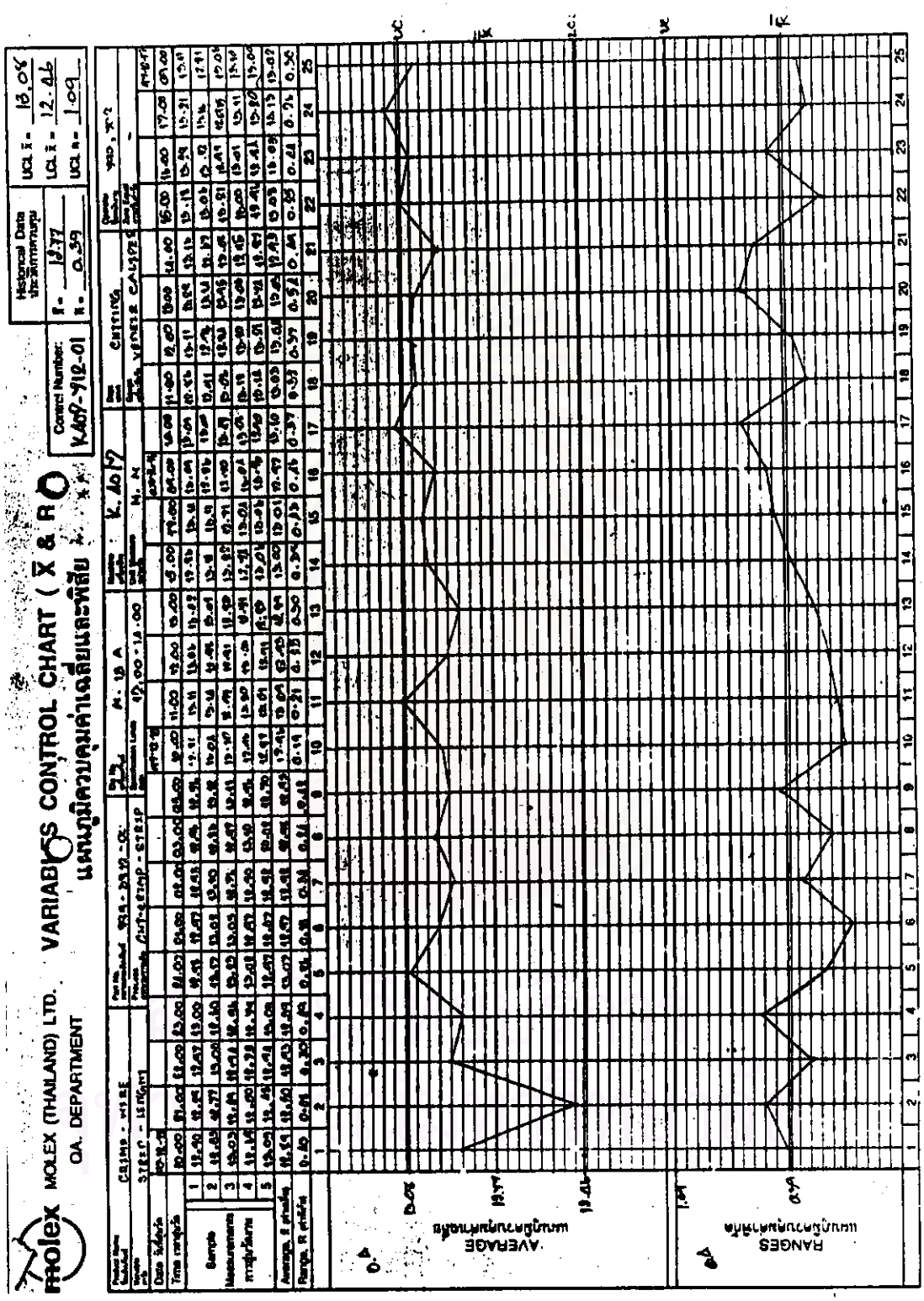

Figure 4.4- Variable control chart ($\bar{X}$- R) for strip length

Source: Molex Thailand, 1997

3 In manual crimping section

Molex Thailand uses monitoring control chart to control crimping strength. The quality characteristic is pulling force. In figure 4.5 show the practical of monitoring control chart to control pulling force of harness wire in Molex Thailand.

4 In manual insertion section

Molex Thailand use attribute control chart which is standardised NP chart to control the defects in this manual insertion section.

In figure 4.6 show the attribute control chart in manual insertion section and there are two points which are out off upper control limit regarding to unlocked quality criteria and missing insertion quality criteria. But there is no investigation for the causes after complete this chart and there is no corrective action. Result of that, it might lead to the increase of customer complaints. In Chapter V, other technique are proposed such as FMEA technique which is to reduce and prevent problems in manufacturing area.

In figure 4.7 there are three points which are out off specification regarding to unlocked quality criteria and wire damaged quality criteria as well. In this figure 4.7, there are two points which are out off upper control limit because of unlocked quality criteria. But there is no investigation for the causes after complete this chart and there is no corrective action. Result of that, it might lead to the increase of customer complaints. In Chapter V, other technique are proposed such as FMEA technique which is to reduce and prevent problems in manufacturing area.

5 In maintenance section

Normally, the standard machine adjustment per machine is twenty one time per day. In Molex Thailand use monitoring control chart to control the adjustment of the machine. In figure 4.8 show how monitoring chart is applied in Molex Thailand. In this figure 4.8, there are two points which are out off upper limit control. There are twenty three time of machine adjustment. From Molex Thailand Engineering Document file, for this chart, the cause of out off control for this chart is because of a lot of setting up crimping machine and the machine is not in the normal situation. The corrective action is the modification of applicator and change the sensor of machine.

In chapter V, FMEA technique is proposed to prevent the potential problems and eliminate the known problems. From this chapter IV, Molex Thailand still have quality problems occured in manufacturing area and needed to be improved by other technique such as FMEA technique which is described in Chapter V.

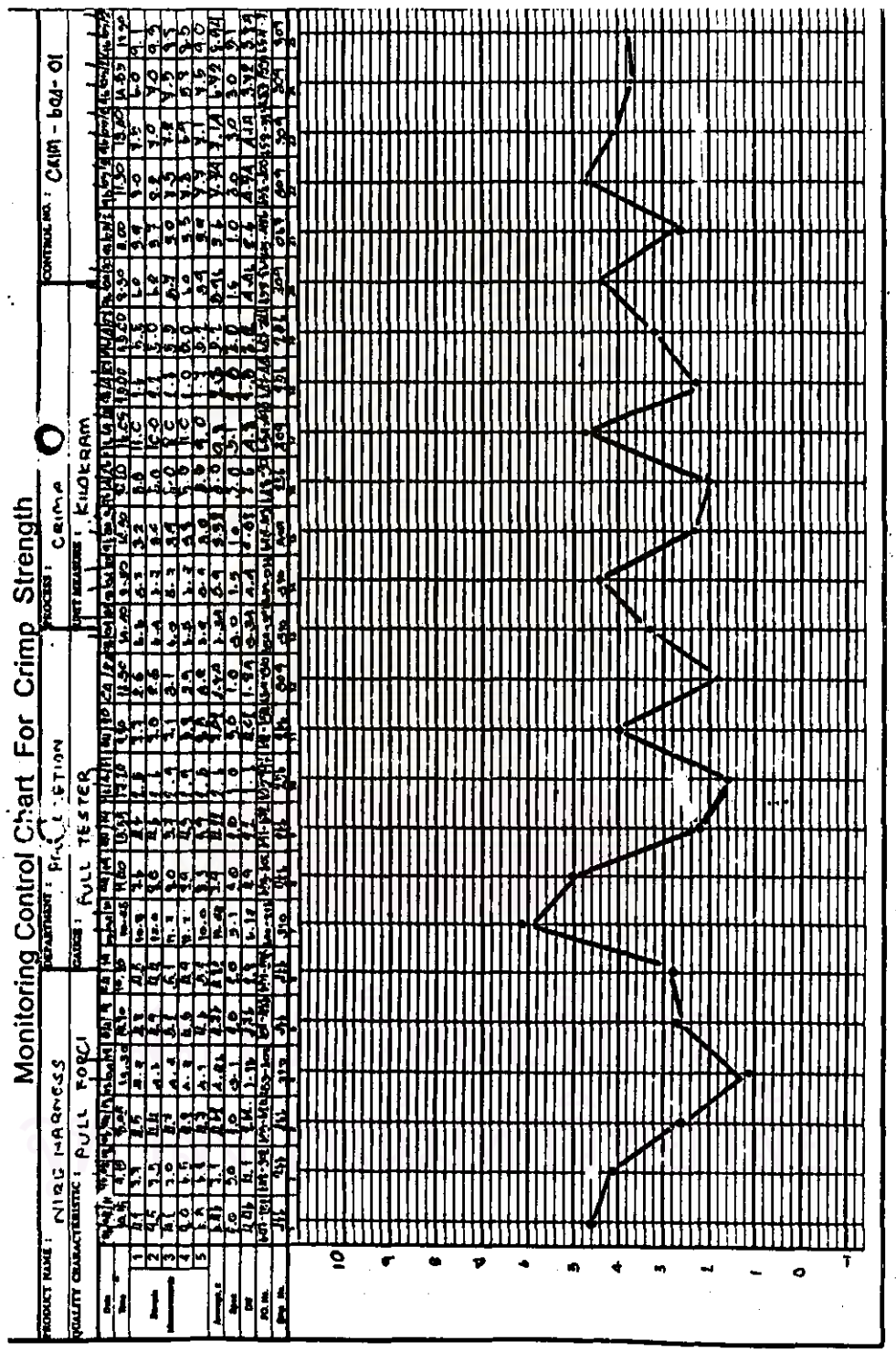

Figure 4.5- Monitoring control chart for crimp strength

Source: Molex Thailand, 1997

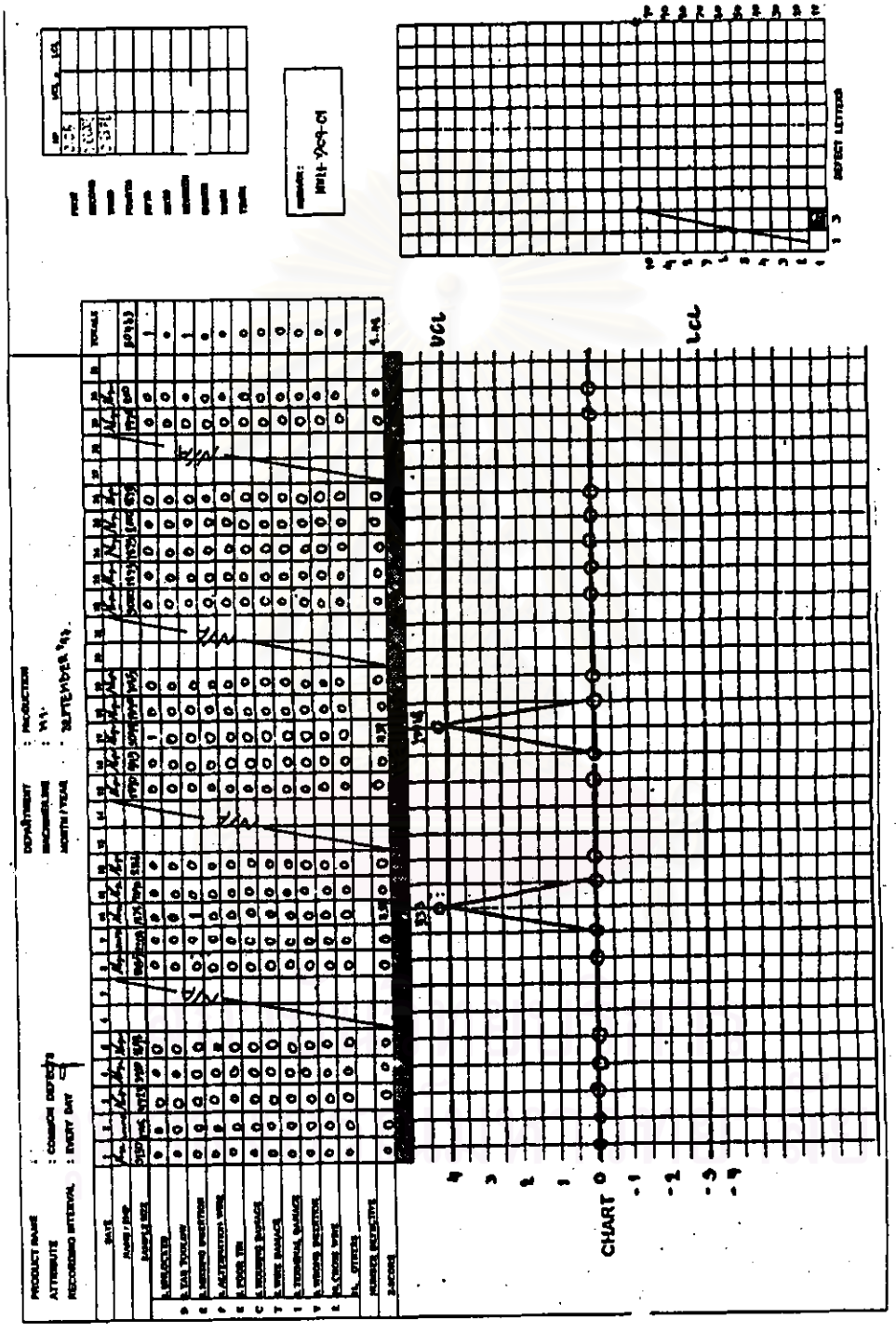

Figure 4.6- Attribute control chart in manual insertion section

Source: Molex Thailand, 1997

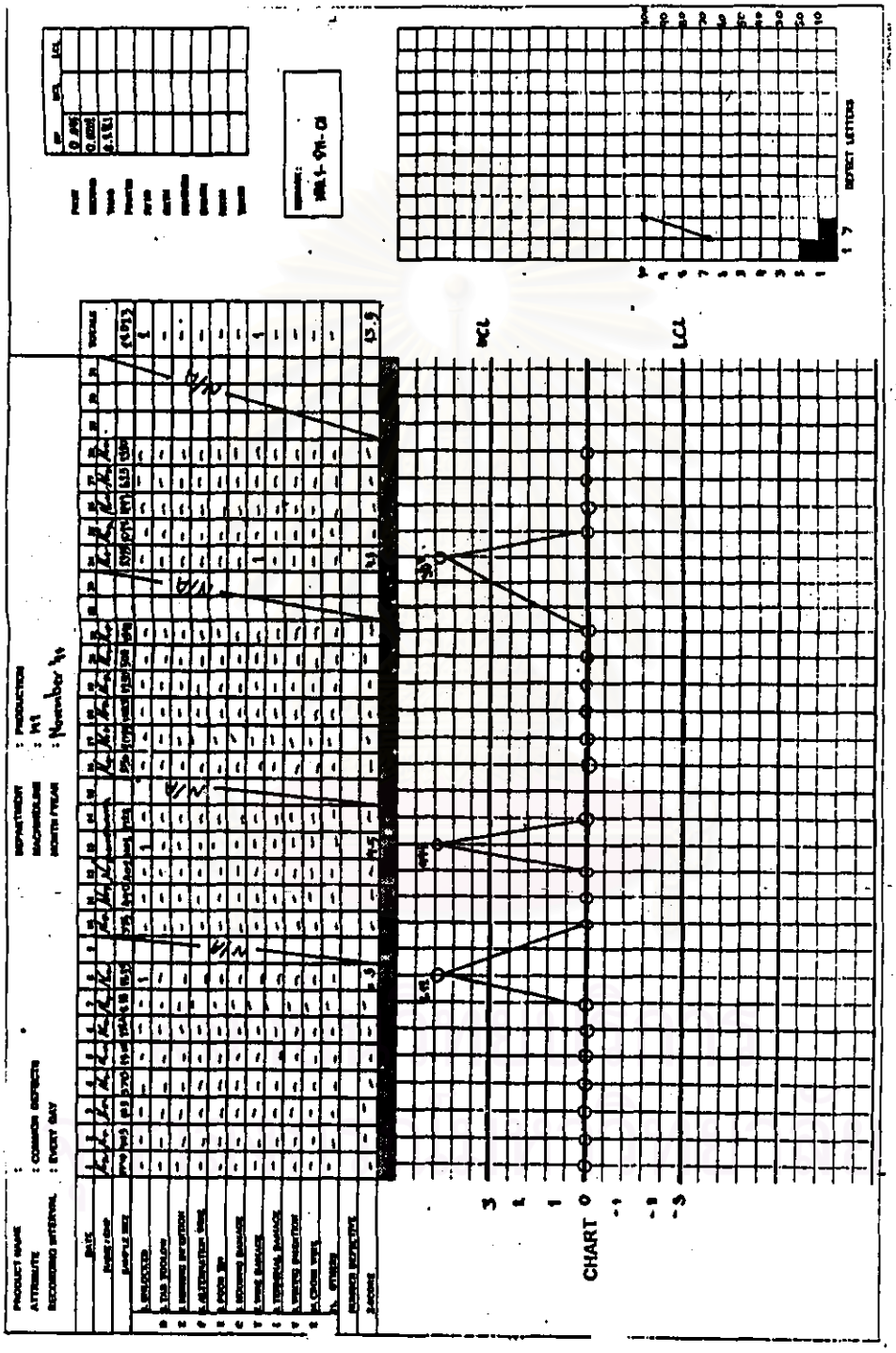

Figure 4.7- Attribute control chart in manual insertion section

Source: Molex Thailand, 1997

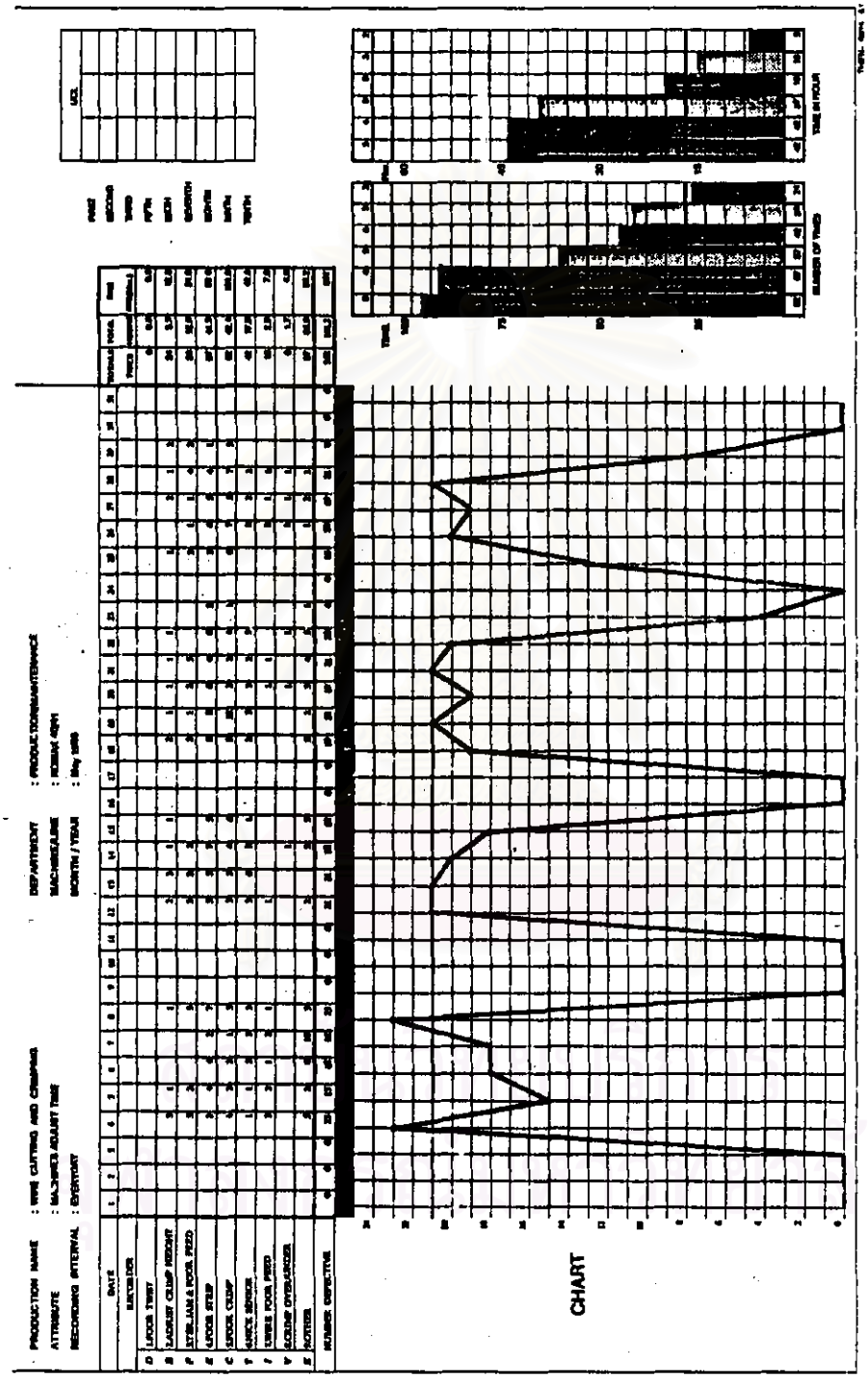

Figure 4.8- Monitoring chart used in maintenance section

Source: Molex Thailand, 1997