

4-5 Work-study for assembly machines:

In our work study we have two assembly machines (A&B), for getting out our observations, specimens were taken from machine A&B in boxes contains 1000 and 3000 parts respectively, to check the reasons of waste with precious analysis and then put the solutions that coincide with complex requirements, so in table (4-3) we have sampling results for the machines before modifications. Before analysis of table (4-3) we must know the test conditions, which include:

1. All testing and reading take place in the morning shift because of complex policy at that time.
2. Three weeks were needed to finish all testing processes.
3. The duration time for the two machines to produce 1000 parts about 12-15 minutes, and about 30-40 minutes to produce 3000 parts before modifications.

Table (4-3) analysis:

1. Most percentage of waste about empty cases conditional.
2. Previous stages defects discovered in assembly stages.
3. When we compare between machines A&B we can found big problems in the efficiency and performance of the two machines.
4. The machines had problem in standard spare parts (spring for example).
5. There is a really problem in maintenance processes (cleaning and degreasing mechanical parts) although there is activated maintenance program(Appendix C) which seen the main problem of waste.
6. The raw material is new type and until now under test.
7. The main problem is nonexistent of the original and standard spare parts which lead to depreciation of the machines because it has direct relation with machine design, for example the spring which used in handling device is locally manufactured, so it is not conform to specifications.
8. There is a main problem in handling device, which lead to delay in handling time in the falling of the lead core into cases.

From table (4-3) analysis, we found that the main reasons of waste are maintenance, low spring stiffness and efficiency of handling device. So to improve and reducing quantity of waste we have to make some modifications for the machines, the modifications include:

- Changing the spring of handling device by new one with high stiffness.
- Maintain the handling device (cleaning and degreasing).

- Adjusted the machine (zero point).

These modifications have direct influence in reducing the quantity of waste. Table (4-4) shows the results of waste after machines modifications.

Table (4-4) analysis:

1. In boxes, which contain 1000 parts, the percentage of waste is reduced from 4.7 to 1.3 in machine A, and from 2.0 to 1.0 in machine B.
2. In boxes, which contain 3000 parts, the percentage of waste is reduced from 3.2 to 0.56 in machine A, and from 3.27 to 0.43 in machine B.
3. Quantity of empty cases is decreased with high ratio, which indication to the improvement of handling device efficiency after modifications.
4. The defects were reduced to its low level but not reach zero defects.

Although these quantities of waste comparing with percentage that accepted for complex management, is acceptable; but if we know that the big quantity of products that production daily and comparing the waste with the very high cost (material cost (the price for one ton of CU= 300000 SD), operation cost, transportation cost, maintenance cost, ... etc) we can found that we must do our best and continuous improvement so as to reduce the waste to the minimum level (zero defects), so by doing that we can increase productivity and profitability and reducing cost from economic side to achieve complex ultimate targets.