Statistics Division Minipaper
'Stop Light' Control

## by Maureen S. Heaphy and Gregory' F. Gruska

With emphasis on "build it right first time" and "you can't inspect quality into a product," many traditional and new quality techniques are being implemented. One simple but effective procedure is stop light control which is a precontrol technique. The underlying philosophy is to detect the significant changes in the process. Stop light control requires no computations and no plotting, thereby making it easier to implement than control charts. A sample as small as two pieces with an occasional three additional pieces for a marginal process is all that may be required. Although the development of this technique is thoroughly founded in statistical theory, a program can be implemented and taught at the plant level without involving statistics.

The assumptions in stop light control are twofold:
- the system is in statistical control,
- process performance (including gage variability) is less than or equal to blue print tolerance.

The first assumption means that all controllable sources of variation in the process are being controlled. The second assumption states that 99.73% of the pieces being produced are within specification without sorting.

If the foregoing assumptions are satisfied, the tolerance can be divided so that Nominal ± 1/4 Tolerance is labeled as the green area and the rest of the area within the blue print specification is yellow. Any area outside the specifications is labeled red. Statistically, 87% of the pieces are in the green area, 13% are in the yellow area and 0.3% are in the red area. These calculations assume the distribution of parts is normal, and the process capability is between 50% and 80% of the tolerance. Similar calculations could be done if the distribution was found to be non-normal or highly capable.
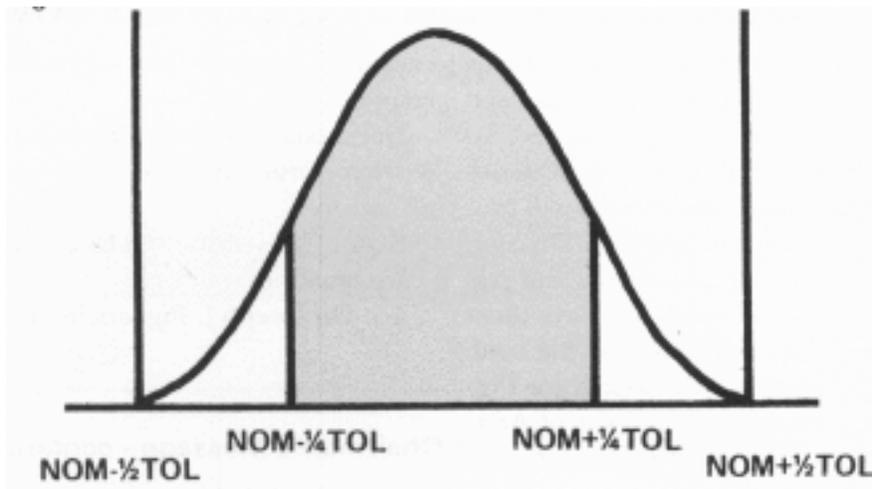
The steps for stop light control can be outlined as follows:
1. Check 2 pieces; if both pieces are in the green area, continue to run.
2. If one or both are in the red, notify designated person for corrective action and sort material. When

setup or other corrections are made, repeat step 1.

    a. If one or both are in the yellow, check three more pieces. If any pieces are in the red, notify designated person for corrective action and sort material. When setup or other corrections are made, repeat step 1.

    b. If none are red, but three or more (out of five pieces) are yellow notify designated person for corrective action. When setup or other corrections are made, repeat step 1.

    c. If three are green and the remainder are yellow, continue to run.

Measurements can be made with variable as well as attribute gauging. Certain variable gaugings such as dial indicators or air columns are better suited for this type of program since the indicator background can be color coded. No charts or graphs are required.

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FOR FURTHER READING

A decision rule that is similar to, and perhaps even simpler than, stop light control was developed at the Jones & Lamson Machine Company in 1954. A discussion of this rule, called PRE control, can be found in the third edition of Juran's *Quality Control Handbook* (on page 23-30), An updated version of this procedure is a possible subject for a future minipaper.

An interesting discussion of control charts and decisions rules is also given by j. E. Jackson in an article entitled "Evaluate Control Procedures by Examining Errors in Process Adjustment" which appeared in the April 1977 issue of the *Journal of Quality Technology*.