

Abstract

A manufacturing process of erbium doped fibre amplifiers is complicated. It needs to meet the customers' requirement under a present economic status that products need to be shipped to customers as soon as possible after purchasing orders. This research aims to study and improve processes and production lines of erbium doped fibre amplifiers using lean manufacturing systems via an application of computer simulation. Three scenarios of lean tooled box systems are selected via the expert system. Firstly, the production schedule based on shipment date is combined with a first in first out control system. The second scenario focuses on a designed flow process plant layout. Finally, the previous flow process plant layout combines with production schedule based on shipment date including the first in first out control systems.

The computer simulation with the limited data via an expected value is used to observe the performance of all scenarios. The most preferable resulted lean tooled box systems from a computer simulation are selected to implement in the real process of a production of erbium doped fibre amplifiers. A comparison is carried out to determine the actual performance measures via an analysis of variance of the response or the production time per unit achieved in each scenario. The goodness of an adequacy of the linear statistical model via experimental errors or residuals is also performed to check the normality, constant variance and independence of the residuals. The results show that a hybrid scenario of lean manufacturing system with the first in first out control and flow process plant lay out statistically leads to better performance in terms of the mean and variance of production times.