CHAPTER-7

CONCLUSION AND SCOPE

We cannot ignore the contribution of machines and machine based engineering in global developing world as well as developing country like India. The participation of mechanical engineers have played the major role towards globalization and computerization of the real world for giving the tight competition to the innovation of technology for smooth running of machinery system. Therefore, it is impossible to avoid the importance of machine and its components. The concepts of machine/machinery/components have been fully supported by reliability of the system. Here reliability refers the probability of the system or component which can be worked under given environment and specified time limit without any failure. In general sense performance of any machine has been judged by the minimum number of failure under specified time is commonly known as the optimum reliability of the system or machine, if all are in normal condition .Mechanical engineering can be understood by well known bath shape curve which correlates the reliability, availability, maintainability, type of inspection, repair & replacements policy of component, and failure rate. The major concerned of this thesis has been tried to develop the structure/configuration of any machine network of a system by various ways. The mathematical modeling and analysis of machinery for some technological system with calculating the reliability is fully based on type of configuration and repair policy with certain maintainability .Initially we have set the requirement of the machine then know about the design of the machine after then coding and testing of that particular component or system. When these three are avail to perform perfectly hence this machine is ready to implement for user. An attempt has been also extended to calculate the reliability of inventory production system, appearance and disappearances of repairman for users.

The overall research work has been carried on reliability modeling and analysis of machine based component or system. Under this measure research area we include the reliability analysis of One-Unit System with Post Inspection, Post Repair, Preventive...
Maintenance and Replacement and modified version of one unit system with post repair with cost optimization for maintenance and replacement of the system and its component.

These two unique researches are made in the field of machine based system with checking the reliability of system and its component. The various sensitivity analysis like post inspection, repair, replacement as well as maintenance have been furnished with finding the optimum reliability (life of time) under calculation of profit. The reliability related calculation has been also work out for the component of the machine like sojourn time, MTTF, availability, cost and replacement time period, repair time period etc. For the verification purpose, numerical example has been covered with showing the exact reliability and other related indicators in plotted graphs. The uniqueness of this work is studying single unit system with post inspection, post repair and preventive maintenance under a single repair facility is used to repair and post repair for about to fail unit .The post repair is needed only when the repair of the failed unit is found unsatisfactory on go through inspection .Expressions for reliability measures are obtained by using semi-Markov processes and regenerative point technique.

We are not able to solve the mathematical problems for judge the optimum cost in replacement policy due to lack of tools and time which is the limitation of this work. The sensitivity of optimum cost will be also worked out in near future.

The another part of research work has been continued for the development of configuration and model of complicated power system reliability calculation for uses/consumption of power by various switch-boards, terminal & supplier, which is commonly known as 1of 3G and 3T configuration .The overall process explains the distribution of power supply through various ways/routes after power generation in a power plant .The reliability calculation and optimization of power distribution with cost and profit analysis have been covered. In this work, the graphical presentation refers to indicate the relationship of reliability vs. profit & MTTF with behavioural analysis of plotted graph. Operation of this reliability model has been finished by Boolean technique of logical operation for structural and path function of system with reliability calculation. Few observations and future aspects have been indicated in the research work.

The next approach towards reliability modeling has been covered for a pair of unequal unit stand by system for repair inspection post repair and random availability or
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The non availability of repairman with help of regenerative technique. In this view, the two unequal unit standby system has been analysed when repair man is not always available for the system. In this way the one unit go for repair, inspection and post repair where as the second unit becomes as good as new after repair. Here the priority is given to the first unit operation due to its highly sophisticated behavior of costly unit which provides high quality product at low running cost. The second unit is ordinary unit, which have high running cost. Hence, priority is given to second unit for repair due to its less time consuming behavior as compared to first unit. Ultimately when we check out the distribution of time for availability or non-availability of repairman, It seems as exponential in nature. Various reliability parameters are also calculated here with Profit from the cost involved for this model has been also analysed with showing the behavior of failure rate as compare to other parameters. After the various Reliability Measurement we conclude the mean time to system failure (MTSF), Availability and Profit decreases with increasing failure rate for different repair.

It is also observed the MTSF is higher for higher values of repair when we varies the failure rate & other parameters and this shows, the high correlation between failure and repair times which increased expected life of the system. The profit is various as per variation of cost incurred in each unit with different repair effort by repairman. Ultimately, we conclude that profit is sensitive as per cost incurred in repairing and no of visit by repairman and the skill quality of repairperson.

The next part of my research work is being carry on to check the reliability during and after inventory production in highly competitive super market for flexible customers. As we know now a days market is very sensitive and competitive, each and every stage limitation on space must be seen in super market for warehousing/keeping the inventory during production or after production or both simultaneously. The model has been developed with certain assumption like shortage of space produced item is not cent percent perfect i.e. possibility of defective items can be produced. Hence defective items are sold at a reduced price and the selling price of fresh unit is depending on unit production cost. In which generalized EOQ and EPQ have been used for formulation of mathematical model under the fixed target i.e. maximize the average profit under
optimum production cost at certain constraints on invested fund. These constraints have been formulated with the help of differential equation under initial condition for boundary value problem. Optimization of this work has been finished by geometric programming for profit function. The overall process has been finished with the proper justification of optimum reliability calculation during and after the inventory production with certain limitation and assumptions.

The proposed model can assist the modeler in accurately determining the set-up cost, production period and production reliability and also assist the decision maker to decide the effect of different parameters on the total profit of system. Hence the complete research has been summarized with achieving the objective of research topic “Analysis of Reliability modeling for some technological system applied in mechanical engineering”. This may used in near future by some mechanical engineer or automobile industries. All the newly developed reliability system has been justified with proper examples and its sensitivity has been seen in the plotted graphs. This work gives the new idea and approaches for optimizing the reliability for machine based engineering like power distribution, inventory production in critical situation as well inspection, repair and replacement of particular unit of a component/system within the limited invested fund and gives the maximum profit under optimum efforts by machine men. There is lot of scope to extend the entire work as per requirement in near future. This work is one of the parts of coming aspects in this field.