Rakesh petrol pump essay

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The main Objective is to study the queuing phenomena of vehicles and minimize the queues at various refueling points. The relevant data have been collected and the queuing analyses of different queues have been performed using TORT (Techniques of Operations Research Applications) software. Finally, some useful suggestions have been made.

Introduction The problems of queues/ waiting lines are very common in our everyday life. Queues are usually seen at bus stop, ticket booths, petrol pump, bank counter, traffic lights and so on. Queuing theory deals with the mathematical description of behavior of queues. Queuing theory can be applied to a variety of operational situations where it is not possible to predict accurately the arrival rate of customers and service rate of service facilities. In particular, it can be used to determine the level of service (either the service rate or the number of service facilities).

The present study is a part of a consultancy project which is undertaken at Brat Petroleum petrol pump in Greater Oneida, India. Brat Petroleum petrol pump is one and only petrol pump in Greater Oneida near the heart of the city adjacent to Nasal Plaza. It is the only petrol pump between Greater Oneida and Oneida 24 km expressway.

Due to one and only fuel outlet in the city long queues can easily be seen in the service area. Company deals in supply of petrol, diesel, Extra Premium, turbojet and lubricants from Brat petroleum. Company has 8 refueling pumps, 4 for two wheelers and 4 for four wheelers and heavy vehicles. The petrol filling station has employed 12 service executives, 8 collection executives, 1 accountant and 1 supervisor working under the ownership of a

Retired Army officer. The petrol pump was established in 15 January 2005 and was the second petrol pump after one in the Surplus industrial area. The terror pump is located at Pair Chock the entry point and the most important square of Greater Oneida. The completion and opening of Nasal Plaza one and only multiplex, increased business Of the petrol pump significantly. Nearness to the Knowledge Parks also added to business because it added thousands of customers in its consumer pool.

The problems of queues at various refueling points have been studied and the key reasons which result into long queues have been identified. The suitable queuing models have been developed for different queues by studying the arrival and service patterns of customers. The models have been solved using TORT software. Objectives of the study The objectives of the study are: (I) To understand and identify the queuing problems at petrol pumps.

(ii) To perform quantitative decision making using the appropriate operations research models. (iii) To develop suitable queuing models for mini mining the vehicle queues at various refueling points. (iv) To decide up on the opening of one more petrol pump.

Methodology The methodology to solve the problem involves the following: 1 . Primary data collection and direction observations 2. Secondary Data The secondary data pertaining to the number of service staff and their salary, umber of supervisors and manger with their salary, cost of operating the machines, profit per unit and other overheads have also been collected. Formulation of Queuing Model At each refueling point there is only one

queue and one service executive. The vehicles join a particular queue one by one and they are served one by one on first-come, first served (OFFS) basis. There is no limit on vehicles joining a particular queue. The primary data collected shows that there was complete randomness in arrival as well as service patterns.

An M/M/I queuing model has been proposed for each queue, which is based on the allowing assumptions: (I) The vehicles arrive at a particular queue one by one and follow Poisson distribution with parameter n, where is the mean arrival rate. (ii) There is only one server at each queue and the vehicles are served one by one on OFFS basis. The service times are independently, identically and exponentially distributed with mean rate p. (iii) The capacity Of each queue is infinite, meaning thereby any number Of vehicles can join a particular queue. Here, we have four M/M/I parallel queues. The mean arrival rate X and the mean service rate p of the four queues have been calculated from the data as follows- Solution of the model The Queuing model has been solved using the TORT software and the following results have been obtained. Various measures of performance like pop -the probability that there is no customer in the queue, L's- average number of customers in the system, LLC- average number of customers in the queue, Was- average waiting time of a customer in the system, Was- average waiting time of a customer in the queue, the servers utilization and the server's idle time have been computed for all the queues. This is the time when most of the persons go to or come from their office and alleges, thus increasing the inflow of vehicles at the petrol pump.

Rest all the times, they have limited number of vehicles which they can easily serve and the vehicles in the queue at that time were one or two vehicles waiting for their service. This suggests that Management can go for some part- time employees during the peak time periods and the cost of hiring such employees will also be low. The first two queues are for Petrol and the third and fourth queues are for Speed. From table-I, we can see that the average queue lengths in queues 1 and 2 are higher than in queues 3 and 4. Consequently, the average waiting times in queues 1 and 2 are higher than that of queues and 4. The comparative analysis of all the four queues in table-I provides a quantitative basis for analyzing the queuing phenomena at petrol pump. The individual analysis of the four queues have been given in the annexed-I.

In annexed-I, the probabilities of ' n' (n Upton 20) number of customers in the queue have also been shown which help to deal with the uncertain queuing formations. The petrol pump manager can better decide quantitatively on the number of service executives required at a particular mime period, the utilization of service facility, the idle periods and the delays faced by the customers in different queues. Such analysis will definitely help the manager efficiently run the facility. Earlier, the managing staff used to take decisions qualitatively, which was resulting into wastage of time and resources. The cost of opening another filling point is very high in comparison of the margin profit generating from that extra filling point.

And the rate of arrival of the customers is very fluctuating so the idea of opening another filling point is not appropriate. Some more filling stations

are soon opening in Greater Oneida mainly one from Indian Oil at sector Delta, which can change the customers' inflow so any further decision can only be taken after these competitors are functional. Conclusion The queuing problems under consideration have been studied quantitatively. Suitable queuing models have been made and quantitative results have been obtained.