THE LAPTOP SPARE PARTS STUDYING UNDER CONSIDERING USERS’ REPAIR WILLINGNESS

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Abstract
With the development of science and technology, laptop becomes very popular. Laptop manufacturing firms are concerning how much spare parts they shall prepare to meet the demand of repairing. The quantities of spare parts are not only related to laptop life time, but also concern with users’ repair willingness. We propose an approach to calculate the repair probability of laptop parts combined Poisson Process with users’ repair willingness. In this study, the users’ repair willingness relates laptop parts failure frequency. The new approach’s verification is carried on by simulation. The significant test results show that simulation data fit theoretical value very well. By survey data and simulation result, we find that after four times broken for a laptop, a user will give up repairing it. The calculation result of new approach shows that spare parts quantities are entirely lower than traditional theory. From this point, if laptop manufacturers know their each parts lifetime, with the help of this paper, they can cut down their spare parts and save their service costs reasonable than before.

Key Words: Laptop Spare Parts, Users’ Repair Willingness, Poisson Process

1. INTRODUCTION
The laptops are necessary electrics for many people. When someone’s laptop is broken down, what he will do? Buy a new laptop or send to repair it? In our life, we find frequently when a laptop is out of working, a person will not repair it at once. He may buy a new one instead of repairing it if this laptop has been broken many times. With the computer manufacturing technology development, this phenomenon becomes more common. So manufactures shouldn’t prepare their spare parts as usual. The users’ real repairing demands are less than before. How to estimate the quantities of spare parts under considering users’ repairing willingness is the core issue of this paper.

Many people have studied the electric products spare parts from the life time theory. The users’ repairing willingness is seldom discussed in their papers. In this paper, we have studied the laptops lifetime firstly, and then we have investigated the users’ repairing willingness by survey data. After that, the approach of spare parts calculation based on users’ repairing willingness is put forward. Finally, simulation model is built to verify the approach, and significance test has been applied to make sure researching work is tenable.

2. LITERATURE REVIEW
There is a lot of researching on spare parts management. Increasingly, scholars have found out many different ways to do the investigation.

Some researchers have investigated spare parts issues from inventory problem. Al-Hawari et al. (2013) studied the great effect of on-hand inventory and percentage of satisfied customers on the supply chain management and got the different inventory policies about high/low demand rate through simulation model [1]. Mostly inventory policies are based on demand forecasting, Buchmeister et al. (2012) put forward a three-stage supply chain’s inventory policy based on time series of the market demand data [2]. Huiskonen


