**J.R.A. Gerritse** ***Logistieke inrichting van modulair onderhoud.***
**Masters thesis, Report 94.3.LT.4329, Transport Engineering and Logistics.**

This report presents an investigation that has been done in order to gain global insight into the performance of a modular maintenance system. Combined with this a comparison was made with the 'traditional' execution of maintenance work. The reason for this investigation was given by a renovation project of Gasunie and therefore this project has served as a case for this investigation.

A simulation model was developed, through which the effects of a number of factors on the performance of a modular maintenance system were investigated. These factors are the capacities of both the internal and the external maintenance facilities, circulation-stock (of exchangeable modules) and the rate at which the learning curve can be utilized. The performance was evaluated on the basis of four indicators namely the total project execution time, the passage time of the modules and the utilization-rate of both the internal and external maintenance facilities.
The model developed was intended to be used on the renovation project of Gasunie, but it is developed in such a way that it can be applied on modular maintenance systems in general.

For the traditional execution of maintenance a model has been developed as well, which was derived from the modular model. Results of both models were used to compare both alternatives.

In order to analyze the simulation result, linear regression has been used. With this method the responses of the simulation model on variations in the input are summarized by means of mathematical formulas. This way a large quantity of simulation results can be structured and more insight in the behaviour of the simulation model is gained. Through this method it is also possible to make up for a disadvantage of simulation, namely the fact that through simulation we only get results for the combination of input we use. To be able to use these results to predict the outcome with a different values of the input parameters without performing new, time-consuming simulations, we can use the metamodels that we obtain with linear regression.

In general it can be concluded form the simulations that an insight is gained in the performance of the systems and the necessary tuning of the different factors. As to the renovation project as considered in this report, it can be concluded that the modular system is the best; because of the ability to use the learning curve extensively the total amount of work to be executed is less then when it is done in the traditional way. The time that the technical systems are out of order due to maintenance work is also shorter and through the modular concept it is easier to attain standardization.

---

Reports on Transport Engineering and Logistics (in Dutch)

---