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# Efficiency in Service: Where The Streets Are Paved With Gold

In Japan, the average travel time of a Field Service Engineer ranges typically from 30 to 60 hrs per month, or 3.8 – 7.6 working days over the same period of time. Considering 20 working days per month, the travel time loss ranges from 20% - 40%, or more. Travel expenses for gasoline alone range typically from 250 000 – 600 000 yen per Field Service Engineer per year; highway fees can easily double this amount. Cases are known wherein the travel expenses exceed the cost for an additional Field Service Engineer.

This can be avoided!

*by Reinhold Stapf*

**T**he previous article of the series showed how the time-to-solution, the time calculation that starts from the customer call that reports a machinery problem until the machine is up and running again, can be controlled and improved. With this method, money and other resources can be used efficiently. Customer satisfaction increases, which is a very important factor in any B2B and B2C business in Japan.

In this installment of the series a look will be taken into the influence of the installed base, workload, travel time, and the number of Field Service Engineers (FSE) to the time-to-solution.

This article applies only to field service operations, where FSEs travel to and from the sites of the machines or systems.

Currently, a navigation system is regarded as a tool to make the travel time of a FSE more efficient. However, this is only true for the travel distance between two points. It is much more effective to keep travel distances at the lowest values possible from the beginning. Long travel distances lead to huge losses in the control of the time-to-solution and the availability of the FSEs.

The reduction of travel distances can be achieved by having many FSEs distributed throughout the country. However, this would , from the point of view of cost efficiency, definitely be the worst solution to take. It is wiser to look into the details of where and how often FSEs are needed. Such an approach will lead to the best combination of the number of FSEs, travel effort, and costs.

Very closely connected to this issue of optimization is the way the next FSE's employment is decided upon. Ongoing investigations show that in most cases the decision to hire a new FSE is based on customer complaints about too long response times, by complaints from the sales department about customer complaints or com-

plaints from FSEs about too much overtime work Based on these complaints, the decision to hire a new FSE is carried out typically one to two years too late; therefore, customer satisfaction is already lost. Customers may have been lost as well, and tremendous efforts will then be needed to get them back from competitors.

**Workload Calculations**

One does not need to wait so long to action. There are means to identify new staff requirements and have a new FSE ready for field work at the right time and in advance. The key word is "mathematics."

The number of staff needed for an area is the sum of the service workload plus travel time required in the area, divided by the number of hours an FSE is allowed to work. The service area could be an entire country or any region in a country. Staffing of a service area is only a fine-tuning of the staffing of a country.

Service workload can easily be calculated in a spreadsheet. One needs to know the number of machines per machine type, the mean values for required time for installations, repair, maintenance, and other work. All these figures are available from any state-of-art service management system. If not, they can be approximated based on experience, and can be fine tuned over time rapidly.

Industry- and company-depending machine specifics are included in these parameters. Thus, at the end of the calculations all these specific differences are included in the calculated results.

**Travel Time And Service Area Optimization**

Travel time calculations are a bit more difficult because probabilities need to be considered.

Travel time for spare parts depends very strongly on the spare parts logistics of each individual company. Therefore, this article focuses only on the generally valid statements concerning installed machines and their failure rates. However, it is pointed out that for every company the travel time for spare parts can and must be included in these calculations.

Depending on the area distribution of installed machines, clusters of installed machines need to be created. The failure rate for each cluster represents the probability for service requests in each cluster. Grouping of clusters under consideration of travel time defines an area for one FSE. The travel effort can then be estimated by the service request probabilities for each cluster and the travel time between clusters. General formulas for the optimization are rather complex and therefore, experience-based partial manual iterations lead to an optimal area for one FSE with the least travel effort. In the ideal case the home address of the FSE is the center of these probabilities to reduce the travel time in the morning and evening for typically more than 200 working days per year. Deviations from this ideal location are normal but should be made as least as possible because 200 working days per years with a travel time savings of 1 hr /day adds up to 25 working days per year or the equivalent of about one working month.

" Softening" of the service area borders is the next step of optimization. It means that on the spot an FSE from a neighbor area responds to a service request if that FSE is close by and can

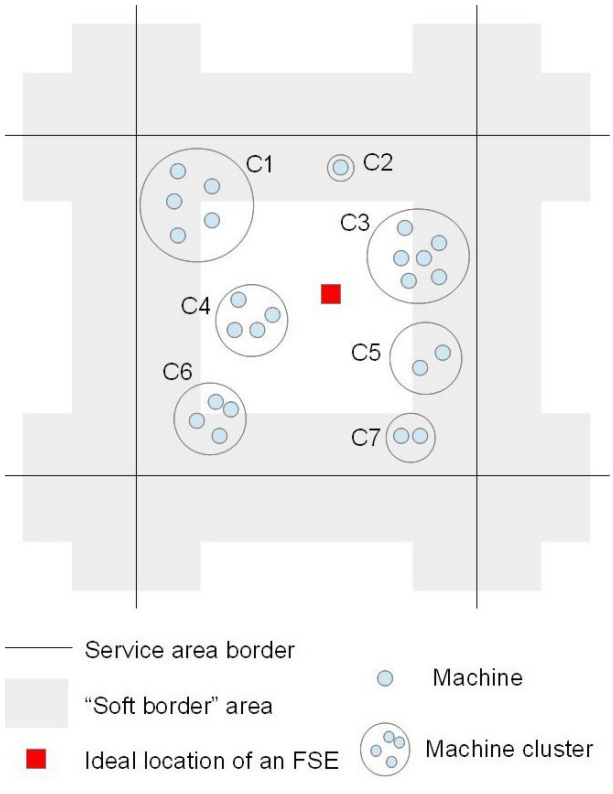


*Illustration 1: Schematic Service Area*

be utilized without scarifying the response time for another customer. Such an appointment has to be arranged by the dispatcher who prepares customer visits in a parallel process in the office

and has the necessary overview of the service jobs and travel time.

**Looking Into The Future**

Returning to the above statement, the decision of employing an additional FSE is related to the optimization of travel effort, the number of FSE s and costs. Introduction of the time axis into these calculations and iterations allows the important need to look into the future. It gives answers to questions, such as "how many?" and "when?" if the number of machines to be sold in the next 2-4years is taken into these calculations Therefore, it is possible to hire, train and prepare a new FSE in time before any complaint occurs.

All these calculations and iterations have additional side effects: First, they provide a full set of arguments for the application of hiring a new FSE for the headquarters. Second, customers can be given the most probable response time to their service request and third, they provide the basis to sell response time-based services on a call-by-call basis or in form of a contract.

Dr. Reinhold O. Stapf

Founder of *the service institute japan kk*, a company focusing on the increase of effectiveness and efficiency of service operations. He has more than 20 years of experience in service management and general management and is trained in process improvement and change management.
Email: stapf@tsij.org
URL: www.tsij.org