

IMPROVING THE OPERATIONAL EFFICIENCY OF FAULT REPAIRING WITH PARTNERSHIP MANAGEMENT

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ABSTRACT

Improving the operational efficiency of fault repairing is the target that every DSO is aiming for. Striving for shorter customer interruption times and lower costs are evident. Typically DSOs approach this from a very technical perspective for example evaluating distribution automation investments. This certainly has a beneficial impact but the improvement of the real operational fault repairing must not be ignored. The efficiency and actions of the electricians in the field repairing a fault are at least as important.

An increasing number of DSOs have outsourced their non-core functions including fault repairing and are purchasing services from external service providers. The improvement of the services providers' operational efficiency can be achieved with a successful partnership management.

This paper presents partnership management actions that have had a beneficial impact on the operational efficiency of fault repairing. In sum, this paper challenges the traditional thinking regarding measuring employee performances, hourly-based invoicing in fault repairing and granting external service provider companies to have access to the Distribution Management System.

INTRODUCTION

An increasing number of DSOs in Finland have outsourced their non-core functions and are purchasing services from external service providers. By using purchased services they aim at focusing on core-business, cost savings, having better resources and getting the possibility to exploit best practices and know-how in the industry. [1]

Fault repairing is maybe the most controversial function when observing it from an outsourcing point of view. When organizing fault repairing as a purchased service, people easily admit that in major disturbance situations one can have more and better fault repairing resources when comparing it to in-house resources. On the other hand many DSOs see the outsourcing of fault repairing too high a risk. They are afraid that the service provider partners are not able to handle it in an efficient way. When all is said and done, it comes back to the DSOs' partnership management skills. Hence, the DSOs in Finland see the lack of

management systems and tools to measure as well as ensure the quality of the purchased services as big risks [2]. Fortunately the business is developing in this matter and learning from other businesses where partnership networks have existed for a longer period. [3]

Elenia, former Vattenfall Nordic Distribution Finland, is the second biggest DSO in Finland with its 12 % market share including 408 000 customers. The length of the electric line per customer is approximately 160 meters. The partnership network of Elenia is unique. It can be said that Elenia has taken its actions deeper into the partnership network than any other DSO in Finland. Elenia has outsourced all its electricity network construction, maintenance, services and fault repairing into a totally open market. These functions and many others are purchased from the partnership network.

Elenia has systematically developed the management of its contractor partners and the partnership network that they form. Reaching the goals together with partners requires successful partnership management with good interaction, the right tools and functional procedures. [4]

The electricity network of Elenia is mostly a rural area overhead network in forests with long distances so the operational efficiency of fault repairing has a significant impact on the reliability figures of the network. Elenia has systematically carried out actions towards a more efficient outage management process, for example investing in remote controlled disconnectors, redundant field communication network and AMR-based fault indication for low voltage network. [5] These all have and have had a beneficial impact but the improvement of operational fault repairing must not be ignored. The actions of the electricians in the field repairing a fault are at least as important. The improvement of the services providers' operational efficiency can be achieved with a successful partnership management.

This paper presents partnership management actions of Elenia that have had a clear beneficial influence on the operational efficiency of fault repairing. These are measuring of the partners' fault repairing performances as a part of the partners' scorecard, using unit-priced invoicing instead of hourly-based and granting the partners access to the Distribution Management System.

PARTNERSHIP NETWORK

In electricity network related services Elenia co-operates with approximately 30 external service provider partners every day. Elenia employs about 700 full time employees from partners and during peak situations the number can rise up to about 1000 full time employees. The fault repairing services are purchased from so-called annual contractors.

The electricity distribution network of Elenia is divided into 22 geographical areas. Each area has its own annual contractor with a three-year-contract plus two one-year-options. The annual contractor for each area was chosen using a public tendering process. Some annual contractors have several areas so the total number of annual contractors of Elenia is eight. The contracts are unit-priced including small-scale network construction, planning, maintenance, service functions and fault repairing. Elenia orders these services for areas from each responsible contractor.

Each annual contractor has primary responsibility for the faults in their own area but the fault repairing is not geographically limited: a contractor can also be called to other areas depending on the need. Outside office-hours, contractors have stand-by personnel in the areas in case of faults.

MEASURING AND SCORECARD

A crucial part of the partnership management is a measuring or evaluating system that follows the functionality of the chosen strategy and how well the objectives are reached. The system should be able to measure the performance of the partnership network at different levels and it should work as a functional feedback system and as a strategic steering tool, especially in business branches that are critical to society, such as electricity distribution, ensuring the quality and stable performance of purchased services is crucial.

For several years, Elenia has systematically measured the performances of its partners. For example, costs, efficiency, delivery times, quality of work, customer satisfaction and progress of development projects are constantly measured and reported. Elenia not only uses scorecards as a strategic steering tool for its own processes and personnel, but also for partners that are seen as a team that operates in mutual processes. The scorecard crystallizes the strategy and the objectives of the partnership, measures the success of the strategy and improves interaction when mutually evaluated. The scorecard builds transparency for the management when the contractors know what is expected, and the performances are systematically analyzed.

The scorecard defines the target levels for partners' performance levels but it does not say how those must be

reached. The partners are given a free hand to define the developing actions by themselves but they are discussed together with Elenia. The purpose of the scorecard is to innovatively develop the processes and encourage the contractors to find new solutions that benefit the partnership mutually.

A measuring system set demands for IT-systems. Elenia delivers and partners receive all work orders electrically via ERP interfaces using a standard protocol. This enables needed activity following and steering reports on both sides.

FAULT REPAIRING PERFORMANCE

In the year 2008, Elenia started to measure the partners' fault repairing times from the start of the outage until the last customer affected by the outage has electricity back on. These times for low- and medium-voltage were measured from the Distribution Management System, Tekla DMS and openly reported case by case and the contracting area by area to the partners on a monthly basis as a part of their service quality report (see Figure 1). The partners were put into a ranking order depending on their average fault repairing time and the ranks were published. At first, this caused controversy as it was said that Elenia did not have the right to do this, but the partners adapted quickly. Also, the partners had to give a short clarification for all longer outages for why it took longer and how it can be handled more efficiently in future.

As per the old saying, you get what you measure really showed its power. Almost immediately after the partners had informed their employees about the measuring, improvement started to show. The electricians were more ready to leave on call, equipment and materials were better prepared and the use of resources was optimized to the ones closest to the fault locations. At the same time, the importance of safety was highlighted. More efficient fault repairing must not be achieved by neglecting the safety.

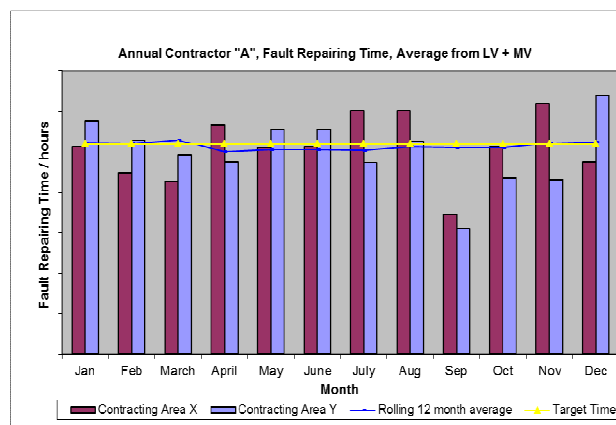


Figure 1. An example figure concerning fault repairing from the monthly service quality report.

After one year of measuring and following, a target time for fault repairing was given to every partner for every contracting area with financial incentive within partners' scorecard. The partners' fault repairing performances were also connected to the Elenia's partners' quality index that has an effect on their tenders for projects. This boosted the development further. Some partners conducted the incentives directly to their electricians with good results. If a team manages to repair a fault clearly under the target time, they receive a fixed bonus for every fault case.

Predictably, this raised some criticism from partners who were not performing so well. They argued that the contracting areas are not equal and some partners have better change to success because of the better structure and condition of the electricity network and because of easier terrain. Elenia counter-argued that there is no significant difference in contracting areas and the most influencing aspect is how well the partner has organized its fault repairing process. This was shown to be correct when a new contract period started and some partners' contracting areas changed through tendering. Well-performing partners bring their efficiency to new areas and the performance level of less efficient partners followed them. By measuring the fault repairing times and with these described actions the average interruption time of Elenia has shortened noticeably.

UNIT-PRICED FAULT REPAIRING

In construction and maintenance the unit-priced invoicing has existed for a quite long time but the fault repairing is traditionally done with hourly- and cost-based invoicing. There is no incentive for efficiency. If one thinks of two faults that are alike, another partner repairs his fault in four hours and the partner is paid for four hours. If another partner repairs the similar fault in two hours, customers have their electricity back faster but the more efficient partner will have less turnover.

To improve this, Elenia started to measure the partners' fault repairing costs per work order. The partners marked and invoiced their costs per order. The following and reporting of the each partner's performance level was carried out in a similar way to the fault repairing time. The costs were measured in three categories: low-voltage outages, medium-voltage outages and threatening faults. Threatening faults are faults that have not caused an outage yet but must be handled fast, like a tree leaning close to an electricity line.

As in the fault repairing time reports, the partners were put into a ranking order depending on their cost-efficiency. Again, after starting the reporting, the partners' average fault repairing costs decreased slightly. This was due to the fact that the partners' installers knew that they are followed and they no longer rounded up their working hours which

they had done in fault repairing outside the office-hours. After about one-and-a-half years of monitoring, there were enough statistics and the average performance level of each of the partners was clear. Also, the partners were familiar with their performances and the factors behind the costs. After this, Elenia proposed a pilot project for some partners using unit-prices in fault repairing. The partner would receive a fixed price for repairing one fault regardless of the case, time or date. There would be three unit-prices, the same ones as in the following report: one for low-voltage outages, one for medium-voltage outages and one for threatening faults. The unit-prices would be minus 15 % from the reports average prices and the pilot project would be carried out with an open-book principle. If the pilot shows to be unprofitable for the partners when comparing to the normal hourly- and cost-based invoicing the loss would be compensated.

The pilot-projects were successful and during these the definitions of one outage or fault were specified. Also, a risk-limit for major faults and outages was set. If the actual costs of an outage or fault rise over the limit, it is no longer included in the unit-price and it is paid according to the realized costs. The whole idea of the unit-prices is based on average. Sometimes one has difficult faults that cost more to repair and sometimes the fault are far easier. On average level unit-pricing must be profitable, not every case.

These pilot projects were extended to all annual contractor partners. Afterwards, the open-book procedures and the pilots were ended and the three unit-prices for fault repairing with the risk-limit were included in the contracts.

The difficulty in the unit-priced fault repairing is introducing it to new contractor partners that have not worked for Elenia. New partners do not have the statistics, experience and know-how to fix the price. However, in these cases Elenia has enough experience to describe the main factors that are influencing on the costs of fault repairing and Elenia can provide them with an average overview of the statistics. The biggest obstacle for using unit-priced invoicing in use with partners is its uncertainty and risk thinking. Nevertheless with will, trust, good statistics, optimal risk-limit and procedures it can be used and it can benefit both.

Using the unit-prices in fault repairing has improved the efficiency of Elenia's operational fault repairing significantly. The partners have developed their actions in order to get a better profit margin from the fixed price. The fault repairing unit-costs in some cases have decreased more than 20 % when comparing to hour-based invoicing. At the same time the partners say that their profit from the fault repairing has increased.

Unit-pricing also eases the partners' bookings for invoicing, for example there is no more marking of the hours and kilometers. This makes it easier for Elenia to inspect the invoices and follow the costs and budget of the fault repairing. Unit-price thinking has also given electricians some entrepreneurial spirit. The more efficient they are the more their company gets profit, as in unit-priced construction works. At the same time this shortens the fault repairing times and the customers have their electricity back on faster.

DISTRIBUTION MANAGEMENT SYSTEM

Traditionally DSOs have defined the Distribution Management System (DMS) as core information to which not even all DSO employees have access. When the processes with partners become more integrated the sharing of information becomes more and more important in order to succeed together.

Elenia has granted the partners to have a remote Citrix access to Elenia's Tekla DMS. The partners can see the real time operational and switching state of the whole network. This has given the partners a new tool to combine their workforce GPS-tracking with the maps and operational state of DMS to optimize and plan their operational fault repairing to be faster and more cost efficient. All partners use DMS in their office to coordinate the fault repairing and some partners' electricians use it in their laptops at the field.

At first, granting the access to DMS was mainly only for sharing information about the operational state of the network to be used in fault repairing. Today, the partners use it as an everyday tool. They do switching planning, AMR-queries and are responsible for the low-voltage network operating during the office-hours. Providing DMS for partners has influenced positively on costs and fault repairing times.

DISCUSSIONS

The demands on electrify distribution reliability from customers and the regulator are tightening significantly. This sets challenges on DSOs. Well planned and focused investments are the key to success. However, there are always faults in the networks and repairing them must be efficient as possible. If the fault repairing is inefficient it can ruin the good results from investments. The efficiency and actions of the electricians in the field repairing a fault are the main factor together with the efficiency of DSOs operation center and coordinating activities.

The improvement of the partners' operational efficiency can be achieved with a successful partnership management. Also, the same principles work if a DSO has internal fault repairing resources. The results of Elenia are encouraging and the benefits have really realized. The fault repairing

times have shortened and the costs decreased remarkably. A practical example of how the measuring of the fault repairing and the unit-prices have had an impact on the partners' actions is in the case of an outage partners try to return the customers electricity as fast as possible and then, if possible, move the final repair for example from costly Sunday night work to the following business day to get more profit from the unit-price.

One must remember that successful partnership management requires will, trust, sharing of information and good systematic interaction in order for both parties to understand the mutual goal and to find the best steps to achieve it.

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