FYRPLUS MEKATRONIK AB

Compilation of a handbook for project managers

Overview - **Fyrplus Mekatronik AB** combines expertise in mechanical engineering, electronics and software to offer package solutions for production, testing and integral systems. The company has customers in the Swedish defence, pharmaceutical and telecommunications industries.

Since the company has only been in existence for nine years – during which time it has expanded from four to thirty employees – there is little documentation of its working methods, which creates problems when providing estimates and managing projects. The need to describe how the work is to be carried out each time also places an unnecessarily heavy burden on projects. Specified procedures and working methods would simplify matters a great deal. The company aims to achieve ISO 9000 certification in the foreseeable future, but it has been difficult to know where to begin and what the end result will look like.

The remit of the SPIRE project was to significantly improve our chances of running successful projects by improving project management. The aim was to produce a handbook for project managers, which we succeeded in doing, and the handbook is now used within the company. The project gave us an excellent start in working towards quality certification. We learned the importance of allocating time continuously during the project, thereby achieving a sustainable workload, allowing time to deliberate and make improvements, and constantly seeing results that drive the project forward.

The Organisation and its Environment

Fyrplus Mekatronik AB produces mechatronic projects combining mechanical, electronic and software components. The company aims to offer package solutions for production, testing and integral systems.

The company has customers in the Swedish defence, pharmaceutical and telecommunications industries. The company undertakes both consultancy contracts on an hourly basis at customers' sites and entire projects in house. The projects undertaken vary in size. The two largest projects each lasted for about a year and employed four to six people.

The organisational structure is flat, comprising five groups reporting to the MD. Four of these groups are technical teams specialising in mechanical engineering, electronics, software and technical documentation. The fifth group deals with administration and finance. Project teams, which report direct to the MD, are drawn from these groups.

Fyrplus Mekatronik AB was founded in 1989 and currently has about 30 employees and a turnover of around SEK 20 million for 1998.

The company, based in Karlstad, won the Entrepreneur of the Year award for Värmland county in 1997. The judges' citation stated:

"*In the space of a short time, the company has developed into a highly profitable enterprise employing over 20 highly qualified young technicians. This has been achieved by developing and offering a range of integrated services encompassing electronics, mechanical engineering, software design, production technology and technical documentation.*"

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Software development forms a key part of the company's expertise, and Fyrplus aims to strengthen further this aspect of its operations in the future. With more and more people joining the company, we need documented procedures to ensure that new recruits become familiar with our working methods quickly.

Marcus Andersson, one of the project managers, has worked on projects including a robot cell for a customer in the pharmaceutical industry. He commented: *"We need specific procedures and guidelines to support us in our project work. We may be skilful technicians, but without good project management support, we seem to spend unnecessarily large amounts of time deliberating over the administration of the project."*

The mechatronic projects at Fyrplus involve a mixture of people with backgrounds in mechanical engineering, electronics and software. This means project managers have to be well versed in co-ordinating and understanding the work of the various teams.

Stefan Johansson, project manager at Fyrplus with additional responsibility for customer quality, said: *"Whereas previously we could make do with common sense and instructions pinned up on the wall, nowadays we need clear, specific, documented procedures that not only reflect our current requirements but also provide a basis for our future working methods when there are twice as many of us."*

Everyone at the company agrees that quality assurance does not have to be a heavy administrative burden of no benefit to anyone. Rather, procedures provide support in the company's day-to-day work, making it easier to focus creativity on the real problems, the technical solutions.

Lennart Olsson, MD of Fyrplus, said*: "A key aspect of our quality assurance policy is to promote creativity rather than bureaucracy and simplicity rather than complexity. That must also apply to the quality assurance system itself."*

Starting Point

Together with our mentor, Håkan Wickberg from IVF (the Swedish Institute for Engineering Technology Research), we began to analyse our current status. We identified a number of areas where there was room for improvement. To minimise the work involved, it was necessary to focus on one of these areas. We decided the most important criterion in choosing which area was the relative benefit an improvement in that area would produce for the company.

After some discussion, we concluded that improvement of the administrative aspects of project management would significantly boost our chances of running successful projects. At that stage, we had no documentary material in the field of project management.

A four-man project team was appointed and a working plan drawn up. It was crucial to allocate the work evenly over a long period, since all members of the team were simultaneously involved in other time-consuming projects. To complete the project within the set time and with the allotted resources, we had to discard some procedures which we really regarded as part of project management, but which were less important than the others.

Synquest software was used to provide the company with an assessment of the current situation, known as a Synquest assessment.

The Improvement Project

The overall strategy was, in consultation with our mentor, to identify an area that would produce the most effective improvement for Fyrplus. Together we concluded that the most important factor for the company's projects was that they should be steered in the right direction, so it seemed natural to aim at compiling a handbook for project managers. Several other areas were discussed, such as the testing process, but we decided project management was the most important. The handbook was to include procedures for managing requirements, quality planning, project responsibilities, reviews, progress reports, estimating, scheduling, project finance and managing alterations.

Once we had decided this, we sketched the project manager as an actor on a large piece of paper and studied a number of scenarios in which various supporting actors appeared. These scenarios resulted in our drawing up a list of procedures designed to support the project manager in his role. The list was cut down after discussions with our mentor and then incorporated in an improvement plan. This plan divided each procedure into a working package comprising a set task, start date, completion date, objective, risks and description.

We wished to improve the figures in our Synquest assessment, aiming to increase them from 16% to over 25% for project management and from 25% to over 50% for configuration management.

Another objective we are seeking to achieve through the SPIRE project is that no project should run beyond its deadline, notwithstanding the risk factor we have introduced through the SPIRE procedures.

To keep staff informed about the project and its status, it was given prominent coverage on the Fyrplus intranet. An electronic noticeboard showing responsibilities, accrued

time and project status was produced in the form of an HTML file. All procedures were and remain available throughout the company all the time, and consequently employees who were not part of the SPIRE team were also able to comment on the procedures. The procedures too were produced in HTML format.

During the project, the procedures were divided between the members of the project team. To build up a factual basis for the procedures, we read up on project management and economics. We also drew on our own experience in the field, picking out those aspects we believed had worked well previously.

Once the first draft of a procedure was ready, it was reviewed by the other team members. The views and improvements put forward at that stage were then incorporated to produce a workable procedure. Twice during the project we met our mentor, who provided valuable input on the form and content of the procedures. This resulted in further amendments before the procedures could be introduced into daily use.

Finally, the procedures were tested on current projects to see whether they provided the support we had hoped for at the start of the process. We also held an internal workshop to discuss the procedures, and another workshop will be held shortly, once all the procedures have been reviewed.

The MD joined the SPIRE team for the reviews with our mentor, and a further two people were recruited to work on the procedures. Taking on more people during the project admittedly reduced productivity, but this disadvantage was outweighed by the benefits: the ability to incorporate the input of more people, and the fact that more members of staff felt involved.

All those involved in the SPIRE project were and remain extremely enthusiastic about it. It has been perceived as a positive development for Fyrplus.

Outcome

The project achieved its objectives, i.e. to produce a handbook for project managers and to meet the Synquest target. The handbook contains 15 procedures, the contents of which vary, and provides a good foundation on which to build when managing a project.

Most of the procedures proved so good that they were adopted within the organisation immediately. Others were not so workable in their initial form, but provide a good basis for improvement.

Thanks to our mentor's advice to reduce the number of procedures, we managed to complete the process within the allocated time and with the planned resources. However, it was hard work, since those involved had a heavy workload on other projects, which led to some delays. Nor were the procedures produced in the same order as originally planned.

Besides meeting the project's objectives, we began the process of introducing a quality assurance system within Fyrplus. In future we can benefit from having already realised part of that system, which we can use as a basis and a source of inspiration in our ongoing work.

By carrying out the SPIRE project, we established set working methods and created a well-functioning team to continue work on new quality-related projects. In addition, the entire company has been inspired to begin other quality-related projects in various technical fields.

During the process, we came across other fields in which improvements were also required. In this way, the project helped us gain a clearer understanding of what we should incorporate in our quality assurance system.

It is not yet possible to say whether we have met the commercial objective of the project, since it has not been tested on a sufficiently large scale. However, if the project does achieve its aim, then unexpected project overruns will be eliminated.

Lessons

We learned the importance of allocating time continuously during the project. This results in a sustainable workload, allows time to deliberate and make improvements, and constantly produces new results that drive the project forward.

Only lack of time prevented the SPIRE project from being a complete success. Everyone involved in the project had a heavy workload of other projects, and at times it was difficult to fit everything in. In these situations, it is

important for the management to give its backing to quality-related projects, to determine the respective priority of different projects, to move the process forward and to demand results from employees.

In the course of the project, we witnessed the advantages of having a person or group of people not employed by the company to review the material produced. This provides new perspectives and ideas for alternative solutions. It is also safe to say that anything which is unclear to an outsider will also be unclear to new employees trying to familiarise themselves with the company's quality assurance system.

Future plans

Fyrplus Mekatronik will continue to develop its quality assurance system by working in the same way as we did on this project. We shall identify the next area for attention and draw up a plan for the process. The project team will continue its work and will also take in other people within the company, so that its working methods can be spread throughout the organisation.

The next area for improvement will probably be risk management. Synquest will continue to be used as a tool for reviewing our quality assurance system and identifying new areas for improvement. Generally speaking, these should be on a smaller scale than the SPIRE project. Fyrplus will also continue to involve third parties, since this proved beneficial.

Here at Fyrplus Mekatronik we have come to realise the importance of structuring the company's quality assurance system so that it is easy to find the various procedures, to see where procedures are lacking and to know where a new procedure is appropriate. We have already accomplished a great deal in this field, and there is every prospect of having a workable structure in place in the near future.