

Construction Quality

Quality of Processing and Product Quality
with Projects for Residential Housing

- English Abstract -

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Short Report (english)

Construction Quality

Quality of Processing and Product Quality with Projects for Residential Housing

The aspects of construction quality are many and varied. They concern not only quality of work, but they also begin with adequately setting the proper goals for the construction project. They also are based upon the quality of its development, its utilisation quality and its technical qualities. Furthermore, they range all the way to maintaining and operating buildings. Things that could lower the value of residential construction when carrying on residential construction projects are often not recognised in time or the reaction is not thorough enough. This means that deficits are not eliminated and, depending upon their type and severity, they become a part of the final product as a compromise, deficiency or damage. Are we just going around in circles in our efforts to achieve higher quality?

Of course, the quality of project work has a great deal to do with the positive characteristics of the building structure. The planning quality i.e. the quality of processing has to do with smooth project execution, which makes it possible for you to assess whether a building was built trouble-free and in a highly professional fashion. High planning quality makes a similarly important contribution to the quality of construction work as setting high standards when selecting material and designs. However, it can be implemented at lower costs. Up to now, ensuring the planning quality i.e. the quality of processing has rarely been looked upon or come to light as a special challenge for project work. Of course, this topic has been placed in the limelight with the debate on certification, however this connection has damaged the cause more than it has supported it. It promotes the idea of formal complications more than practical aids. It will only be possible to get people to accept consciously working on the quality of processing by applying plausible and practical approaches to increasing quality in all phases of planning. This means determining goals in a qualified manner, finding personnel for the project and organising it through all planning services all the way to construction management. It is necessary and it is also promising to establish quality assurance as a "discipline" throughout in the framework of the project work in parallel to cost control. A systematic form of pursuing (planning) decisions relevant to quality and costs achieved by this ensures that planning will be constantly streamlined together with costs, thus avoiding deficits such as costs without a gain in quality or losing quality without being successful at saving money.

"Work Quality" and Cost Control

We break down the areas of quality as follows:

<i>building quality as product quality</i>	<i>planning quality as quality of processing</i>
<ul style="list-style-type: none"> ▶ technical quality ▶ functional quality ▶ urban construction quality ▶ design quality ▶ benefits for our image ▶ ecological quality ▶ economic quality 	<ul style="list-style-type: none"> ▶ planning reliability ▶ reliability of execution ▶ schedule reliability ▶ cost reliability

Cost Control

Cost control means streamlining the planning process with costs. If costs have already reached their ceiling, the only place where there is still latitude for manoeuvring is in planning. However, this generally means doing without some quality features. Streamlining work between costs and quality is not limited to specific phases of planning. Both of them together, i.e. quality and costs, have to be integrated in the planning process from the earliest phases of planning. There is what is known as strategic cost control and its efficiency can exceed all of the subsequent little work to be done. The possibilities for influencing costs decrease with the progress in the project and the risks that can arise as a result of unclear costs increase. This is the same with quality assurance. It is possible to avoid deficiencies in the early phases that save costs. In the later phases, it is often only a question of correcting deficiencies, thus producing additional costs.

Quality Assurance with Cost-Effective Construction

Cost-effective building does not have to be cheap building. We look upon this as implementing the project's goals in as inexpensive a fashion as possible regardless of whether it specifies low or high standards. Generally, a cost framework is specified and the client asks: "what is the best solution that is feasible for price X?" The first step in planning is therefore to establish the minimum quality that always has to be covered by the cost framework. Beyond this, planning has to examine a series of further and better possibilities that are in quality competition with one another.

Defect-Free Work and Streamlining the Planning Process

Pursuant to work contract law, the representatives of the builder-owner are obliged to provide "defect-free work". However, defect-free work is not a sufficient criterion for the qualities of a building that go beyond the purely technical. Non-material qualities such as utilisation quality and design are much more than the absence of deficiencies. On the

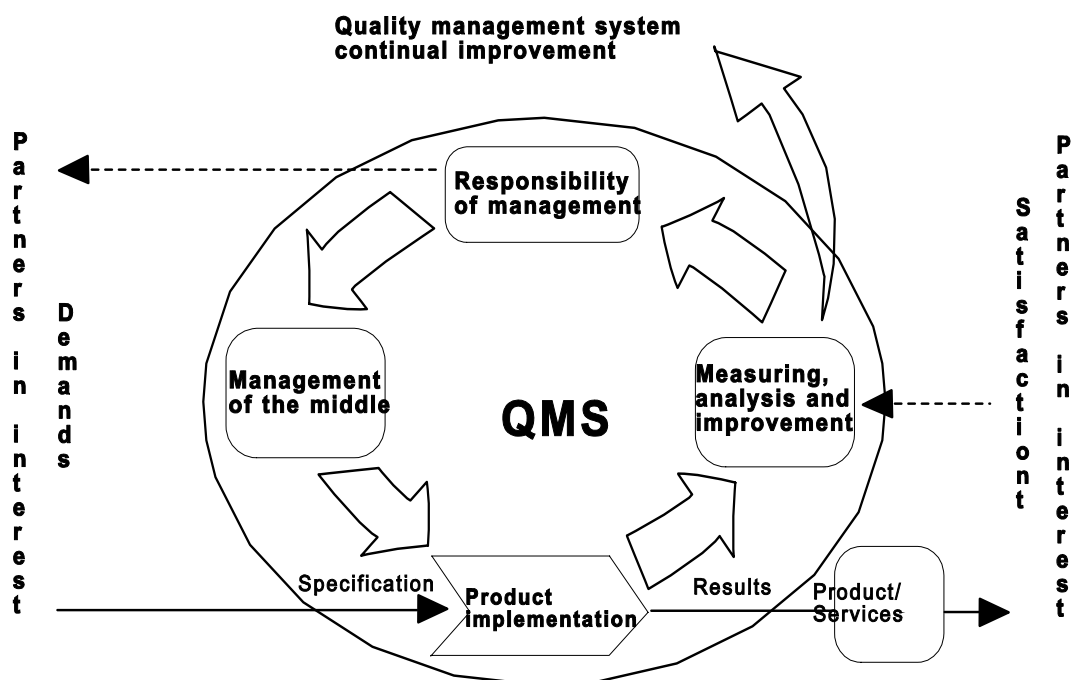
contrary, these are just the minimum requirements, at least in the eyes of many architects and engineers.

DIN EN ISO 9000-9004:

Quality Management with reference to Project Quality

The quality assurance standards DIN EN ISO 9000-9004 from August of 1994 and their revision in 2000, aim at the quality of processing. Higher planning quality makes an essential contribution to improving building quality. It is not a question of immediately negotiating product qualities, but discussing means of organising things to ensure better product quality. Our work is an attempt to determine these means of organising things more precisely and link them to an organisational structure that is practical and promising for a variety of different types of residential construction projects. Architects and engineers were recommended a sequence-orientated system long before the new DIN ISO 9000:2000 in order to arrive at a "usable" quality management system. After all, the 1994 standard is broken down according to elements, making it difficult to build up a relation to the planning office.

Quality Management Process Model



source: DQS Deutsche Gesellschaft zur Zertifizierung von Managementsystemen mbH 2000 (translated)

The modifications worked out for the new standard are comprehensive. They not only concern editorial questions, but also very basic things. The most important change is taking the step away from a quality management system broken down according to elements to a process-orientated quality management system. It is not necessary to demand that each and every element be covered in order to satisfy the standard. The new process-orientated standard makes it easier for companies to develop and implement a quality management system individually suited and adapted to their needs. This means that it is that much better suited to planning offices.

Quality Assurance and Cost Reliability

Quality assurance has always been important with all projects. Therefore, elements of a quality management system have always been a part of everyday work in every company, including planning offices and construction companies. What has been missing up to now is the systematic application of the elements of quality assurance in all phases of a planning work with reference to all construction qualities. It is often individual aspects of quality that are important, for instance costs or schedules, and other areas of quality are neglected. We would like to illustrate quality assurance as a discipline throughout in the planning of construction work. Here, it is a question of how one basically achieves quality in planning and building, which is the main theme that may be found in all efforts towards quality assurance.

The Problem

- ▶ Construction costs are getting out of hand. The cost estimate exceeds the estimate, the cost calculation exceeds the cost estimate, etc. ...
- ▶ There are additional costs without gaining quality, there are losses in quality without saving money.
- ▶ the builder-owner is disappointed when the hoped-for qualities are not achieved. The builder-owner is sick and tired of constantly being asked if the price could be a little bit higher.

The Principle

Cost and qualities are somewhat like communication tubes: if you add something on one side, there's also going to be a higher level on the other end. These processes have to be kept clearly structured to keep them under control. The quality objectives, the cost objectives and the degree to which the goals have been achieved should constantly be brought to mind in project work. It should be possible to check every step in planning for whether objectives have been achieved or at least can be achieved in a comparison of targets and actual achievement. For this purpose, it is necessary to references among the qualities, the elements of the object that represent these qualities best and the costs of these elements.

The Material

As much as possible, the cost information we work with should come from comparable projects as a means of possible. Of course, sometimes it is not always easy possible to establish or fulfil the conditions for comparison. The categories for these qualities are primarily taken from needs planning or possibly from the documented project goals, the space programme and the other things requested by the builder-owner, or they are discussed directly with the builder-owner after preliminary examination.

The Structure

The model of reciprocal control of costs and qualities proposed here should find its personification in planning work. It makes sense, for instance, to divide up the roles between an advocate of costs and an advocate of quality. This is not just because different abilities are in demand here, but also because one single person will find it difficult to find and maintain a balance between these poles. Neither of them is entitled to the right to make the decision. Let's keep things straight: the builder-owner is the judge, perhaps with advice from his generalists. The witnesses are the specialists who can provide further information on the costs and benefits of the alternatives under consideration. Incidentally, an important argument for consulting several persons involved in the project is to maintain intensive communication and co-ordination among the disciplines and functions in the process of planning. In any event, they can best guarantee a high quality of processing and building quality. A form of cost controlling may already be set up in many projects and especially with institutional builder-owners. A parallel form of quality controlling could create a desirable balance.

How This Functions

This is a typical form of streamlining planning and costs. Depending upon the initial situation, this means that it is a question of more quality depending upon whether there are still cost reserves, or it has to be adapted to planning in order to keep within the budget. The most important thing for efficient cost control is to start as early as possible. Therefore, quality assurance also has to establish itself based upon the content of planning. This begins to take shape at the beginning of the planning process and has to be decided quickly. It has to successively adapt itself to the structure of activity planning initially resulting from the contextual links between the various steps in planning and then from scheduling. The priority is establishing content, because this is where the actual points of departure are for quality assurance. Observing the schedule framework offers you the opportunity of having a supplemental influence. Weighing off costs and qualities can often be too complex to lead to a decision in the shortest run. This normally takes place in the form of repetitive cycles (and the team meeting can also function in this fashion):

proposal — criticism — second proposal — second criticism — — — decision.

The team of commissioned planners primarily make decisions based upon technical points, but for the builder-owner, they may be looked upon as a recommendation.

The Results

The builder-owner may reject the recommendation of the planners or he or she may have a different emphasis than his technical personnel. There are conflicts of interests especially when the recommendation of the planners are based upon technical rules. In these cases, the planners are obliged to point this out thus protecting both the builder-owner and themselves from risks. Ideally, streamlining costs and qualities offer us the opportunity of gaining more quality with slightly higher costs or doing without a little bit of quality at significantly lower costs. When the upper limit of permissible costs has been reached, there may be drastic cuts where we are no longer talking about streamlining. Therefore, it is a good strategy for assuring qualities and costs while maintaining a certain latitude.