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**Autor:** Sikkel, L.P.
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# Aspects of Quality and Quality Assurance in Tendering and Contracting

Aspects de qualité et assurance de la qualité dans les soumissions et adjudications

Aspekte von Qualität und Qualitätssicherung bei Ausschreibung und Vergabe

**L.P. SIKKEL**
Prof. of Constr. Management
Univ. of Technology
Eindhoven, the Netherlands

Lodewijk Sikkel received his civil engineering degree at the University of Technology, Delft, 1951. Worked 10 years with the Netherland Railways, 4 years City Engineers Office in Amsterdam, 10 years as director of Contracting firm. Professor since 1974.

## SUMMARY

After presenting some ideas about quality and quality definitions, the article deals with the concept of quality: where is quality created, how does it fit into the building process and what does quality mean on the market? A birds-eye-view is given of quality consciousness, regulations and judgement, management and control. Based upon these different aspects, four questions are asked concerning the way to bring quality into the phase of tendering and contracting.

## RÉSUMÉ

Après la présentation de quelques réflexions sur la qualité et de quelques définitions, l'article soulève plusieurs questions sur le concept de qualité: où la qualité est-elle produite? comment évolue-t-elle au cours du processus de construction? quelle est sa signification commerciale? L'article évoque le comportement vis-à-vis du concept de la qualité, des règlements et jugements, de la gestion et du contrôle. Au vu de ces aspects divers, quatre questions sont posées, afin d'introduire le concept de qualité dans la phase de la soumission et de l'adjudication.

## ZUSAMMENFASSUNG

Nach Besprechung einiger Gedanken zu Qualität und ihrer Definition befasst sich der Beitrag mit konzeptionellen Fragen: Wo wird Qualität erzeugt, wie passt der Begriff in den ganzen Bauprozess hinein und welchen Rang hat Qualität auf dem Markt? Qualitätsbewusstsein, Vorschriften und Beurteilung, Management und Kontrolle werden in diesem Zusammenhang besprochen. Auf der Basis dieser verschiedenen Aspekte werden vier Fragen gestellt hinsichtlich einer Berücksichtigung des Qualitätsbegriffs in Ausschreibung und Vergabe von Bauarbeiten.

## 1. Quality

### 1.1 What is quality?

Speaking about quality in the building-industry seems to be rather a difficult matter. Difficult because of the fact everybody has a certain, or different opinion about quality. Difficult because we use a lot of different definitions, which all prescribe quality in a different way.

So "quality" gives rather a vague notion, since we all use it in another way. So we speak about product-quality, production-quality, quality of measures, quality of the design... And we also use "quality" to express something as quality of labour, quality of life...

And looking back in time, we see that the opinion about quality changes: in 1900 we had quite other thoughts of quality than in 1925, 1950, 1975, 1985... What will we think in 1990, and in the year 2000?

What is quality?
How can we define quality in our contract-phase? How can we do this in the design- and in the construction-phase?
Why do we get so many and so different answers?
How do we communicate about this phenomenon, about "quality".

### 1.2 Some definitions

We could try to find some definitions; such as:

"quality" = valuation, especial of materials and products, in connection with the use of it...

or

"quality" = valuation, pointed to appreciation, especially directed to persons...

or

"quality" = condition, dignity, function...

From these definitions we already learn that quality is something which is related to the use of something in certain circumstances...

In England people speak often from: "Quality is fitness for purpose", which can be explained as: "the amount of adaption of the product-quantifications to the needs of using it..."

Some people think, when they speak of quality, in terms of strength, life-time, appearance, isolation-figures, price, costs, use, ...etc.
Does this mean that real quality is only applicable when we reach an optimum in each of those factors as mentioned?

Preliminary conclusions at this point could be:

1. Quality is only a relative conception.
2. Judging quality is only possible when we do relate product-specifications to factors of use.
3. The same product, with the same specifications has a different quality for different users.

1.3 Two ways of thinking...

So we can come to further discussions about quality when we specify:

a: The "abstract-quality", or the value for use, in which the price (..or costs..) of the product and the purchasing power of the user are not weighed in the quality discussion.

b: The "economic-quality", in which the value of use is weighed against the sacrifices to be done by the buyer or user; in this case we can speak about: "value for money".

So in this last case (b) this could mean that an increase in price (..or costs..), without increasing the technical specifications, in fact means a decrease of quality...

## 2. The conception of quality

### 2.1 Where is quality created?

So we come to the question: where is quality created? And the answer must be: in the production process. Till now we only have spoken of the product as a result of a process of fabrication, of the construction process; now it becomes clear that we have to give all our attention to the way of realisation of such a product, or project.
We should not sieve out bad products or bad lots op product parts through quality control. It is far more better to prevent the production of bad products through quality-management. So quality-control is part of a system of quality-management and we perform our control by taking samples at random during the actual production-process. Conclusions taken from these samples lead to re-regulation of that special process of realisation.

But still... we are not quite complete. If we only direct ourselves to the phase of production, we still get insufficient guarantees to realise products of just the quality which is asked for.
Namely, if the design of that special product is bad or insufficient, if the product specifications don't have the right quality in itself, even with a perfect process-control, then we will realise bad products..!

### 2.2 The quality-circuit

So thinking of quality, we have to look to the design and to the production.
That means in our building-industry: the design, the design-details, the construction-preparation and to the construction itself.

Looking over the whole field, prescribed till now, we have to think in terms of a quality-circuit:

- starting from the market come:
  : via "quality of goals", to the aims of our product...
  : via "quality of program", we reach the design...
  : via "quality of production", we realise the product of project...
  : via "quality of after-care", we come to the maintenance of the realised project, which has to meet the goals, as forecasted at the start of the whole design- and construction-process.

The whole circuit is bedded into the social opinions of quality and value in use. In our profession this social-opinion has to do directly with the main ideas of quality in building, living, working, recreating, environment, employment, innovation,... etc. And this whole field of opinions is constantly moving, is constantly changing. The market is changing every 5 to 10 years.

2.3 Quality in the market

Knowing this altogether, we can look into the next influence-factor connected with quality, when we say:
"Quality of a product (project) is the amount of usebility or capability to fulfill the demands of the user(s) for whom it is produced."

In our former paragraphs we mentioned the relation between the design and construction in our way of thinking in terms of quality; now we direct our attention also to the market: what is asked by our client(s), the user(s) of our project? In terms of our organisations this means interaction with our sales-department!

When we operate within a market which is continuously moving and changing, we have to work in a cooperative way with all the partners in the design and construction-process.

## 3. Quality-assurance?

3.1 Quality consciousness.

After having prescribed the phenomenon of quality in some broader perspective, I think it is time to focuss now on three main factors which give guide to quality-consciousness:

a. quality-regulations
b. quality-management
c. quality-judgement

3.2 Quality-regulations.

We can divide this into:

1. regulations, concerning the products to be produced and the raw materials be used, including drawings, tolerances, receipts, qualifications, specifications...
2. regulations, concerning the fabrication itself: lightning, density, safety, tools, equipment, production-, drying- and hardening times.
3. control-regulations, concerning measuring-methods, statistics, sampling systems.
4. regulations, concerning delivering as: facings, packing, transports, finishing.

3.3 Quality-management.

In this field we think in terms of cooperation between design and construction in such a way that a good use of the delivered product(s) of a project is ensured. We weigh here the influences of the market, the design, the working methods, the instructions, the maintenance of tools and equipment...

3.4 Quality-judgement.

We have to realise now that perfection is unthinkable. It is impossible to bring the chosen level of quality for a 100% into the design. It is also impossible fully to reproduce the product just as thought by the designer...

So we always have to do with a certain drop-out and with some deviation to the settled goals. For instance, there will be some difference between the chosen quality-level (Qch) and the realised quality level (Qre).

We presume that Qre will have a certain relation to Qch, which we can prescribe by:

Qre = fd * fp * Qch

in which fd = degree of perfection of the design in respect of the chosen quality-level.
fp = degree of perfection of the product (project) in respect of the design-quality-level.

Quality judgement now means to control these "perfection-factors" fd and fp in a systematical way.

In each organisation, in each company, we have to follow to which amount the chosen level of quality is realised in the design and to what amount the products - or the project - meets such design-specifications.
Besides, it is advisable to keep track from time to time, whether the chosen quality level is still the correct one, fitting in technical, social and economical developments.

3.5 Controlled production.

So we come to four different points that should be brought under attention:

1. One should manage the different activities as much as possible on real figures and not on some opinions.
2. These figures must be used for the control of the production - or construction process, to reach a maximum of quality with a minimum of drop-out.
3. To use the production-organisation fully, all the members of the personnel must have the right mentality in regard to quality; consequence therefore is that in the production organisation one should not perform very accurate work next to rough work with the same type of skilled people.
4. The responsibility of delivering the wished quality should be laid by those men or women, which are also working on the production-site, which are working on that special product or that part of the project. So this askes for a far-reaching delegation of responsibilities.

In this way we strive for a controlled production, taking into account that "Quality can not be inspected into a product, it has to be built in..."

## 2 HOW DO WE BRING THESE ASPECTS INTO THE PHASE OF TENDERING AND CONTRACTING?

When we read the different paragraphs printed in the first chapter of this paper : "aspects of quality and quality-assurance in the building practice" again, we ask ourselves and we ask our readers: "How can we bring these aspects into the tendering- and contracting-phase?"

We think that some of our readers could send some papers on this subject to us, reckoning with what is written under chapter 1 and dealing with one or more of the following questions or problem-fields:

1. Looking through the different types of contracts, it could be possible that some of these contracts meet quality-assurance in a better way than other contracts; what are the chequing-points in these documents?

2. The client could have special demands and expectations in the field of specifications of safety and of quality. What should be brought into the design, what part in the contract and how can it be offered by contractors, c.q. sub-contractors in the tender-documents?
3. So we come to the tendering-procedures: how are the tender-documents to be judged, what are decision points looking into this quality-problem: is it price, time, control-system, guarantees, responsibility and liability? How does the engineer want the contractor to offer safety and quality in his tender? What is the responsibility of the designer?
4. In what way is it possible for the contractor to bring in his own ideas in the field of quality, versus costs and guarantees?

We think that a lot of different opinions can be brought together, so we can make some selections for contributions in our session B.