

Improving International Construction Processes by Using Critical Incident Analysis

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Abstract

Due to a lot of developments on a worldwide but also local scale, construction industry is still an active area of business, e.g.: Life-cycle thinking in use and re-use of buildings, increasing need for better infrastructure, restoring demolished projects in post-disaster areas, etc. In several parts of the world one or more of these items are actual in the (local) economies. However, construction often plays quite a passive role in it, not being used as a driver but more as a tool for change or improvement.

This paper focusses on the role of construction industry in an international scope as an environment with existing critical incidents during the process, often leading to real conflicts. These critical incidents are exposed by the background, behaviour and expectations (e.g. culture) of the parties involved. This analysis shows there are a lot of specific individual situations and circumstances, being a threat as well as an opportunity for the 'running' and improvement of the process.

As part of the paper, the way how to learn from critical incidents in construction processes is described and discussed, especially in the way how they could be of use on a global (multi-cultural) scale, probably leading towards a useful 'set of tools' in the near future for improving construction processes locally. In fact the paper focusses on the issue of how to learn from experiences in construction, and how to generalize these experiences in such an (international) way, that one can take the advantage of it during the improvement (re-engineering) phase of construction processes. This, within the background of CIB-Taskgroup TG23, 'Culture in Construction', being established to be a 'platform' and 'driver' for exchanging experiences and knowledge worldwide, leading to a serious 'rethinking' of construction industry in the near future.

Keywords: *Change, Culture, Experiences, Learning, Re-engineering.*

1. Introduction

Modern construction industry relies heavily on human skills and craftsmanship. As construction still is a people's business, these issues are important drivers for keeping the delivered proces and

product quality on the requested levels. However, clients do not always accept the delivered quality, as during the construction process several things can go wrong, e.g.:

- *Time-overflow;*
- *Cost-overflow;*
- *Lack of durability and/or sustainability;*
- *Disfunctioning of construction elements/products.*

In general, these failures do have their ‘roots’ in the contracts which lead to the delivered project. However, having a satisfying contract for both client and contractor is not only a matter of ‘writing’; it also and especially has to do with the fulfillment of expectations of the parties involved. This fulfillment needs a very careful proceeding of the initial stage of the construction process [22], focussing on exchange and documenting of the demands and needs of all the parties involved. Such an approach means that during this phase the final outcome of the total construction process will be influenced already within a certain way, as it is being influenced by culture (e.g. behaviour and expectations) of the parties involved during the whole construction process.

As the behaviour of parties in e.g. conflict situations often results into ‘litigation’ [7], serious attention has to be paid towards the process how information is being transformed by the several parties during construction. As part of this ‘transformation process’, e.g. for the construction environment described by Maas [12], the interaction between the parties involved is a key-issue for getting the demanded and/or the desired results. Therefore, it is important to understand the the clearly *exposed* information (e.g. written down in contracts), as well as the *hidden* information (e.g. shown by human behaviour and expectations). Thus:

- *The interaction (transformation) of both exposed and hidden information makes construction processes running.*

See figure 1 for the transformation-issue and it’s complications, combined with the behaviour and expectations of people, based on Maas [12].

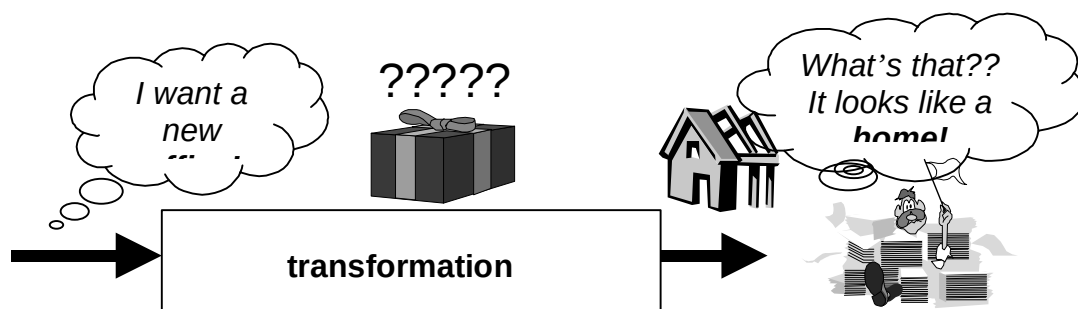


Figure 1: Transformation in construction and it’s complications: Not only a process of exposed information -e.g. contracts-, but also a process of hidden information -e.g. human behaviour and expectations-, based on Maas [12].

As the 'real life' behaviour and expectations of the parties involved plays an important role during construction processes, this paper analyzes some issues of the existing difficulties within cross-border construction projects. More specific, it focusses on the role which 'learning from experiences' plays during striving for improving construction processes on a national and international scale.

Remarks:

It should be clear that daily practice in construction is a very interesting source of information for learning about the specific issues of construction processes. Also Geertz made it in clear from his viewpoint on research in general, when he stated [8]: 'If you want to understand what a science is you should look in the first instance not at its theories or findings and certainly not at what its apologists say about it; you should look at what the practitioners of it do'.

2. Construction industry as 'source of conflicts': Threats or Opportunities?

In construction industry there are a lot of situations involving conflicts and its complications. This is obviously the case in several countries, as e.g. described and analyzed in the British market, Dutch market and German market, etc. [9][3][21]. However, failures and/or conflicts during construction processes are not only emerging since the last century. Also during ancient times this was an existing phenomenon. Think e.g. about the construction process of the Tower of Babylon, as described in the Holy Bible. The differences in language made it happen that the communication between the parties involved stopped, not understanding each other properly anymore. It led in fact to the 'internationalization' of the world those days [19].

Since then, obviously hardly anything has changed: As in international construction processes also the role of communication is one of the most important one, the problem still exists, despite the present availability of state-of-the-art technology. Look e.g. at the information technology in general and the equipment available, e.g. being able to design for constructability [2][16]. However, when transforming the design into a 'real life' project, the production phase is still a difficult one with a lot of failures and risks as described in the introduction of this paper, although it also offering opportunities for new technologies [11].

More into detail, having modern technology available does not mean 'automatically' that the desired performance (e.g. in improving construction processes) is being reached. A systematic approach in learning from experiences -as discussed by Kerssens-Van Drongelen for measuring performance in an R&D environment- [10] may also be wished in the construction context, being able to handle the different behaviour and expectations of the parties involved. Especially, when one wants to control the 'road' on which obviously difficulties according to failures in procedures and/or products may turn into a real conflict.

As e.g. Felstiner, Abel & Sarat described, the raising of such conflicts often have to do with the background, behaviour and expectations (e.g. culture) of the people involved, leading to three different consequent phases of *naming*, *blaming* and *claiming* [6].

However, day to day practice shows that once within the ‘claiming’-phase, there is ‘no backroad’, whereas when being in the ‘naming’ or ‘blaming’-phase there often seems to be a ‘backroad’. However, this often has to do with the (un)willingness (e.g. behaviour and expectations) of the parties involved. Figure 2 represents this schematically.

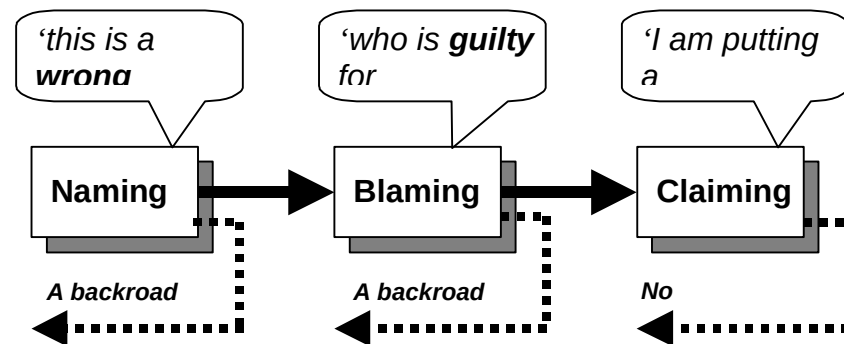


Figure 2: On the road to conflicts in construction, based on Felstiner, Abel & Sarat [6].

The above situation shows that especially during difficulties in construction, being or not real conflicts, the analysis of the behaviour and expectations of the people involved can be very useful for getting real-life information of the people’s culture. This information can be very useful for improving construction processes.

In our vision therefore, we see the raising of conflicts during construction mainly from two viewpoints, being as a threat as well as an opportunity:

- Conflicts are threatening the smooth running of the construction process;
- Conflicts are an opportunity for getting real-life information in the field of culture (e.g. background, behaviour and expectations) of the parties involved.

Both aspects of conflict-situations play an important role in construction processes. However, as this paper focusses mainly on learning from behaviour and expectations of the parties involved in construction, we consider the positive aspect of conflicts, using it as an *opportunity*.

3. Learning from Critical Incidents: A Mechanism of Change in Construction's Toolbox

While of course we don't strive for increasing conflicts in construction processes. As e.g. Moore describes, the existence of critical incidents ('conflicts') are not only a negative issue, but can be also and especially positive: Conflicts can be a 'driver' for organisations to change/adapt (improve!) their rules and regulations [13]. Describing process/project organizations as semi-autonomous social structures, this 'mechanism' will be influenced by the existing culture (e.g. being an easy or difficult changeable group of people, etc.). And especially these situations we analyse during our research activities on parties' behaviour within case-studies in construction industry.

So within this context of e.g. Moore's findings, the use of conflict-situations in researching behaviour and expectations of the parties involved in construction processes, is based on the following :

- *Critical incidents act as a 'driver for change' for the parties involved;*
- *Analyzing and understanding critical incidents can stimulate improvements (e.g. changes!) in construction processes.*

Figure 3 represents this approach schematically, showing the possible ways a construction-process often goes when getting into a conflict situation.

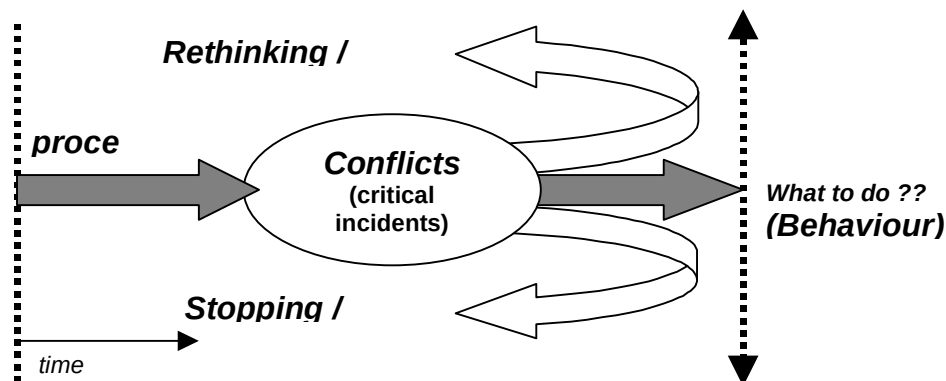


Figure 3: *Analyzing and understanding critical incidents as a 'driver for change' is a valuable source of information for improving construction processes.*

Using the critical incident approach, culture-research makes it possible to understand certain situations in construction process better, using this knowledge appropriately can stimulate the aspect of learning from practice. In addition to this, it can lead towards improving the construction process by overcoming 'barriers' in the process of changing construction. Ultimately the described approach really can help as a tool-box (e.g. 'driver') for changing present construction processes. However, insight into real-life projects is necessarily then.

4. Influences on learning from Critical Incidents: Being Inside and/or Outside the Practice

The focus on critical incidents is an interesting way of getting inside-experiences during construction processes. This, while there are obviously a lot of critical incidents in national as well as international construction, as highlighted in the previous part of this paper.

However, when using this approach in the (1) *collecting* and (2) *analysis* of data for reason of learning more into detail about people's behaviour and expectations in real-life construction processes, especially the following problems may occur:

1. *In collecting data: How to get the real data?;*
2. *In analysing data: How to prevent for interfering with the encountered situation?*

Problem (1):

There needs to be a real open access to the information-sources within the analyzed situation. Especially this is a problem, while generally it's difficult to have access into a 'running' organisation. As means of solving this problem, one can choose for a (partly)participative action research approach [18], being 'inside' the project-organisation, '*...to gain insight and understanding in the management of and interactions in work places*' [15].

Problem (2):

Participating within an organisation to describe and analyze real-life information and experiences cannot only be very useful in getting the right information, but it also incorporates a risk of getting influenced during e.g. collecting data, as one is still part of the analyzed process and/or project. Sanders is describing this as the aspect of '*being a third culture man*' [17], which he expresses as there is a need of specific 'training' of the observing people involved when getting and analyzing the data. The observer should be the 'third culture' in processes, pointing at the fact that in general in a construction (conflict) situation there are often two parties involved (with often different cultures...).

Combining both problems (1) and (2) may lead to the following conclusions:

- *It's really important to have first-sight entrance in daily practice of projects. This means specific one needs good and open contacts with industry.*
- *However, one should continuously train oneself or being trained on the fact that one has to 'step back' regularly, reflecting the experiences during the encountered situations.*

When doing this properly, the reliability of collection and analysis of data will be much more improved.

5. Improving Construction on a Local Level within an International Scope

As investigations within theories and their experiences can differ between several situations and projects [20], the use and comparison of international experiences and their analysis is useful and necessary for getting a more detailed view of practice within construction-processes/projects. Especially as construction industry in general is strongly related to its local context. Therefore a good and detailed view on the local practice is necessary for creating a good learning and/or training environment, especially when one wants to use such information for stimulating mechanisms of change for improving construction industry. Parallel to this, one should be aware that due to the fact construction is still a *people's business*, there will always be human *dynamics*, influencing these results. Within this context the following aspect is still important:

- *Learning from experiences is and will stay a dynamic issue in construction industry.*

And these dynamics are specifically present in international construction environments, as e.g. results from research, analysis and discussions within the CIB Task Group TG23 (Culture in Construction) also clearly emphasize: The importance of understanding local differences and backgrounds (e.g. cultures) are described in their recently published book on 'perspectives on culture in construction' [5]. Also in a book of another CIB Working Commission within, the CIB W107 (Construction in Developing Countries) this is emphasized, focussing on the need for training in developing areas; see e.g. Ogunlana [14].

In addition to the above publications, Erkelens pointed into detail at the need for improving productivity in 'self-help'-building activities in housing projects in developing regions [4]. Besides the often occurred theft of construction material in such areas (and not only in such areas but also e.g. in EU, etc....) the lack of labour quality skills was (and often still is) obviously a serious problem, leading to low quality results. Improvement of construction processes (e.g. productivity-level, etc.) in such situations therefore largely depends then on the level of training of the local employees within the context of their local circumstances & behaviour/culture.

Also Campion, Medsker and Higgs mention the 'productivity'-issue besides 'satisfaction' and 'managerial judgments' in their model of the effectiveness of work-groups [1]. This situation is comparable with the construction industry, where on national and international level employees often work in groups/teams and where also improvement of construction processes is e.g. related to the effectiveness of the employees involved.

Therefore, understanding the role of human behaviour and expectations in an international context or background should lead to the necessary information and insight for improving the training schemes for (local) employees. Moreover, while the employees are the *human capital* of construction companies and processes!

6. Discussion

Improving construction process will only be successful when it takes into account seriously the possible barriers, especially those related to culture (e.g. background, behaviour and expectations). This, while improving construction practice on a serious level needs to be done by changing people, based on the assumption that construction is still a people's business. Therefore, improvement-efforts should not only focus on education and training of knowledge and skills, but also and especially by using experiences in transferring such knowledge and skills, based e.g. on the behaviour and expectations (e.g. culture) of the group(s) of the employees. Analyzing and understanding this will be a valuable base for decreasing the possible barriers, improving the positive effects of training efforts. Not only on national but also on international level. However, this may lead to the following discussion:

- (a) *Can national ways of improving construction by education and training be 'internationalized' by using the added value of cultural data?*
- (a) *Are critical incidents a good and reliable source of information?*
- (b) *Can a partly participative action approach give good and open access to the real practical data?*

This discussion links with the theme of this paper, focussing on the issue of *how to learn from experiences in construction*, and *how to generalize these experiences* in such an (international) way, that one can take the advantage of it during the *improvement* (re-engineering) phase of construction processes.

7. Conclusions & Recommendations

- (1) *Focussing on critical incidents in national and international experiences in construction processes will give better chances for understanding (local) behaviour and expectations, while in critical incidents humans cannot 'hide' themselves without the risk of 'losing' their influences and/or positions in the process.*
- (2) *Education and training in construction improvement processes will be more effective when they are based on the culture-aspects of the people involved.*
- (3) *The use of experiences of 're-engineering' activities in developed areas are a valuable source of information for improvement activities in developing areas. Key issue then is a thorough documentation and analysis of 'real-life data', e.g. based on behavioural analysis during critical incidents in construction projects and processes.*
- (4) *Whereas developing (or underdeveloped) regions will have in general a strong need for improvement of construction knowledge and skills during their development, the developed areas will have in general a strong need for (continuous) improvement by*

re-engineering their processes. This can lead to a more or less cyclic (vice-versa) 'learning from practice'-approach on a global scale.

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