

# The Future Site, Report on a Quest for the Drivers of Change

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**ABSTRACT:** When speaking about The Future Site we presume that in future a site will be different from the present building site. We take it for granted that almost every thing in our modern world is subject to permanent change. But to develop a vision on how that future site will look like it is necessary to develop first a vision on how our world will change in the near future. Changes on building sites are like many things a consequence of a changing world. To state it more specifically: the changes on the building sites will be driven by changes in our culture, our life style, and prosperity, and also - but not exclusively - by developments in knowledge and technology.

The most important drivers for change identified in this paper are the changing values of society. Both legislative and regulatory authorities as well as the end-users of the products of the construction industry are forcing the industry to another way of producing and delivering buildings. As a result the construction process has to be industrialised to an extent not yet feasible. In the course of this process of industrialisation new entrants with a core-business in other industries may appear on our market. Outsiders not programmed by the existing building culture and therefore better qualified to understand and adapt to new rules.

**KEYWORDS:** Building Site, Drivers for Change, Industrialisation, Mass Customisation, Trends.

## 1. INTRODUCTION

The Isarc conference 2003 has chosen The Future Site as its leading theme. Many delegates will present us their views on this subject. We all are confident that the future building site will be different from the present standard. None of the submitted papers doubts whether there will be a change or not. As an introduction to the subject I would like to pose the question “Why will that future site be different?”

The answer is not exclusively found in the availability of new knowledge and new technologies. It can also be found in a changing environment. In this paper 6 aspects of a changing world are identified. That means 6 different reasons why the construction industry will have to change its building processes and products. The list below may be far from complete. I expect that we will agree after listening to all presentations in this conference that there are even more than 6

drivers for change. Possibly we will be able to rank them from most important to of minor influence. Or should we rank them from most threatening for the continuity of our business to less dangerous. Or to say it in a more positive way: From most challenging for the building research community to less demanding. The provisional list I identified reads as follows:

1. Changing values
2. Changing attitude towards technology
3. Clients’ growing awareness
4. Globalisation
5. Industrialisation
6. New Entrants

## 2. CHANGING VALUES

Our society is changing because of an increasing level of prosperity. This enables us to enjoy a better quality of live than our parents did. It also enables us to maintain that quality of life for a

much longer period. We grow much older than previous generations. And we maintain a good health longer. Above that we have more income to spend. This increasing quality of live causes our governments to set higher standards for peoples' welfare. The risk of being subject to a fatal accident is less acceptable than it was ever before. Construction is – together with transportation - among the most risk full activities of our modern society. Both ask for a heavy toll of human live every year in every country. Construction is also – and again jointly with transportation – an activity most hindering for neighbouring people. And on top of that construction is exhausting resources and polluting the environment. So we cannot deny that construction is a threat to the quality of live. Therefore governments all over the world develop policies to reduce this toll of live, this hinder and pollution.

For the future building site this policy will have consequences:

- The building site has to be safer,
- Causing less hindrance,
- Producing less waste,
- Work must be less damaging for the health of labourers.

### **3. CHANGING ATTITUDE TOWARDS TECHNOLOGY**

Not only is the acceptance of our processes decreasing. The whole sphere of work of engineers is loosing appreciation. Technical professionals are easily associated with air pollution, radiation and noise. On top of that technical studies are supposed to be difficult. Such studies are considered to be only suitable for nerds and wiz kids. The new generation prefers studies like business administration and aims for glossy jobs with “manager” or “consultant” on their business card. Many technical faculties are faced with a decreasing number of students. As a consequence of this construction companies find it more and more difficult to fill their ranks with young professionals to replace the greying baby boomers.

If we want to change this tendency we should know what the reason is for this negative perception. Why can our companies not attract sufficient well educated and motivated youngsters like it did before? I see 6 mayor drivers:

- The society doesn't accept our traditional process any more.
- Students do not want to become part of an old fashioned system,
- Construction is supposed to be low tech,
- Construction is supposed to provide a low quality
- Construction is not client friendly,
- Construction companies are mistrusted.

Where I write “is supposed” it is suggested that the others may be wrong. We could better take the view that a client is always right. We should look for the reasons internally. The construction industry has to meet the higher expectation in respect of technology, quality, client focus and reliability.

### **4. CLIENTS GROWING AWARENESS**

The focus on clients has never been a characteristic of the building industry. In many countries housing is in short supply. Land for new construction projects on attractive locations is also in most communities a rather precious good. So project developers and construction companies are in most cases in a strong position. Until recently construction was operating on a sellers market. But clients are nowadays more aware of there position and power than ever before. Pleased by the customised mass production of the automotive industry, the computer industry and many other suppliers of consumer goods our clients expect also from the construction industry a more or less tailor made product. An attitude hard to handle for the construction industry as a whole. But there are examples of mass customisation. [Tomonari] In the Japanese housing industry it is possible to order a prefabricated house to clients' specifications. Of course provided that these specifications remain within the limits determined by the production lines and the transportation over public roads. In Rotterdam, The Netherlands, recently a housing project was developed where all future tenants were offered the opportunity to have there own facade designed and build. [Figure 1] [Beemster] [Scheublin 2002]



Figure 1. Client focused Design

The prospective buyers selected an architect from a shortlist prepared by the project development company and specified their personal preferences and ideas. As a result a facade with a great variety in materials and styles came out. Cost consequences forced the visionary developer to reduce the freedom of choice. But a new approach was born. Clients were pleased by the given opportunity. This may be a first milestone on the road to a more client focussed approach. The traditional building industry will have to adapt to such a new attitude. Otherwise they may lose an important part of their market to the builders of semi-permanent facilities.

## 5. GLOBALISATION

The world got virtually much smaller over the last decades. And it is still shrinking very quickly. Internet gave us the possibility to communicate with almost every person in the world, on line, without any substantial waiting time. Air transport became such cheap that almost everybody in the wealthy part of the world is able to travel where ever one wants to go. Trade barriers were dissolved. Even former communist countries entered into free trade agreements with Western powers. But construction is a rather local business. It does not react very quickly to new opportunities.

Nevertheless globalisation did already change the building industry. [Winch] Labour is now more frequently hired abroad. Densely populated countries in the Far East export labour to Middle Eastern countries with a lack of skilled

construction labour. Middle and Southern Americans work in Northern America. Cheap labour from NAS-countries (Newly Associated States) will seek work all over the Europe when the EU opens its frontiers for labour from new member states. Design and engineering services are through internet supplied to engineering bureaus world wide by offices in low-wages countries. The labour market is already an international market and it will develop into a global market soon.

Does this development affect the industrialisation of the building site of the future? Yes, but not in a positive way. Cheap labour from low-income countries on building sites in high income countries may delay the move from production on-site to off-site prefabrication. Also automation of work on site may be less feasible when cheap labour comes available. But this factor will only disturb the labour market for a limited period of time. Its effect will be of a temporary nature. One day labour conditions will be harmonised. And though cheap on an hourly basis foreign labour is often less effective than automated systems and industrialised production.

A more lasting effect from globalisation will be the supply of labour intensive, high quality but low priced products, produced in low salary countries. Dissolved trade barriers and internet communication will enable this development. In particular easy transportable and complicated items like door locks, air conditioners and fixtures will be purchased on a global scale. The variety of countries of origin will increase. Competition will be intensified and prices of buildings may decrease by as much as approximately 10%. [BRE]

A research project by HBG, my employer, showed that free trade agreements did not immediately open borders. An effort to benefit from the international dimension of the company failed. Purchasing departments of HBG companies in Germany, the UK and The Netherlands compared prices of building materials and mechanical installations. It was obvious that substantial price reductions were possible through purchasing in neighbouring countries.

When this conclusion was tested in practice the results were disappointing. Dealers of international companies like producers of air conditioners and elevators appeared not to be allowed to sell to clients outside their territory.

Equipment from one country did not meet the national standards of another countries, though participants in the same free trade agreement. Suppliers did not accept installation work abroad. And finally language barriers were more difficult to overcome than expected. So though trade barriers are dissolved on paper. In practice there is still a long way to go. But it is foreseeable that in a not too far future purchasing for construction work will be an international activity on a global market.

## 6. INDUSTRIALISATION

Industrialisation is not at all a new phenomenon. It is a philosophy originating from the nineteenth century and was first applied in the USA and the UK. Its meaning grew with the development of steam machines, followed by combustion motors and electrical power. In recent decades it was the growing power of computers that contributed most to the ongoing process of industrialisation. In a definition of industrialisation we would use elements like machines replacing human power, planning and production of series. In this respect the construction industry can be seen as a late adapter. Of course the construction industry also benefited a lot from industrialisation. Human lifting of materials is almost fully replaced by tower cranes and other lifting equipment. A lot of other human work like mixing, sawing, boring etc is also replaced or supported by machines. Nevertheless, when compared with other industries, construction is lagging behind. There are still many man-years of manual work invested in each building process. Also planning is not as advanced as it is in most other industries. Frequent adjustments of the planning to the real progress on site are not unusual, to say it carefully.

But it is foreseeable that in the near future also the building process will be industrialised to a higher degree. The growing awareness among clients of an unacceptable quality, a sub-standard product and the higher standards for labour conditions and

environmental care will force the industry to a better controlled process. A process with a mayor input from prefabrication plants. On site only assembly of big elements will take place. On future sites construction will be replaced by mounting of big elements. Hardly any labour will be left on site.

Some alternatives for manual work on site are:

- Prefabrication of voluminous elements,
- Prefabrication of panel / slab systems,
- Plug-and-play systems
- Click connection systems
- Robots on site.

## 7. NEW ENTRANTS

Contractors are facing a demanding and sometimes even hostile world. Clients claim that quality levels are below reasonable expectations. A zero defects product is considered to be the standard. Governments set higher standards for an environmental friendly process, a labour friendly process and a process without hindrance. Subcontractors try to sell their products and services direct to the end user. And the image of the building business is lower than ever before. Though it was never very high at all.

Under these circumstances clients are ready to look for alternative solutions. Solutions offered by other industries. Industries with a better reputation for quality and client focus. Such alternative builders who may enter the industry are:

- Shipbuilders
- Suppliers of temporary facilities
- Removable homes
- House boats
- Furniture suppliers
- Kitchen and sanitary industry



*Figure 2. New Entrants Approach*

At the CIB sponsored conference on Re-valuing construction in Manchester [Scheublin 2003] A full analysis of the new entrants was presented. It was concluded that the construction industry is already loosing ground to new entrants. If the “old” industry does not change its processes than more and more new parties will enter and many may be successful.

One of the most extreme examples of a new approach was the Bolder Office Building [Figure 2]

That may be the direction the building side of the future is moving to.

A 10-storey office building, constructed on a shipyard, floated to its final destination and lifted on its foundation with a giant crane.

They al have another clients perception. Most of them do not tender for contracts

## **8. THE FUTURE OF IAARC?**

In this quickly changing world there is no place for a conservative industry with a traditional process. The building process must be adjusted to meet the requirements of a modern society. In particular the building site, with its threat to health, safety and environment should be changed without delay. To achieve such a revolution in thinking and doing requires apart from a cultural

change a lot of research. Of original thinking. Of alternatives.

IAARC-members are in the right position to support this movement. But IAARC and its members are not the only research partners for the construction industry. There are several other research communities, ranging from formal associations to informal networks. All these bodies bring together researchers from universities, from government agencies, from industry branch institutes, from big clients and many other innovative forces in the building industry. All these networks have their own conditions for membership and their own specific area of reseach.

There are even federations of networks, providing their membership with the services of a permanent secretariat. Funding for research from the European Union or the United Nations is often awarded through these federations for further distribution.

IAARC may consider to connect itself to one of these international networks and to benefit from the stronger position and the economie of scale.

Even when we come to the conclusion that IAARC does not need the benefits from a larger network it is still important to be aware of the growing competition for research budgets. We are not the only network. So we must demonstrate to be the better one.

This overwhelming participation in this ISARC 2003 conference is underlining IAARCS’ strength and its value to members. Lets keep in mind also our clients - the building industry - must benefit from our efforts. Their continued financial and moral support will give us the opportunity to keep contributing to a better future site.

## **9. CONCLUSIONS**

It may be concluded that there are many drivers for change. Most drivers are basically the result of a changing society. A society with higher expectations in respect of quality of products, environmental care and care for good labour conditions.

As a result of these higher expectations the traditional industry must change its attitude and its processes. That means that the industry must industrialise. If traditional players are not able to meet the new requirements, companies with there roots in other industries will certainly conquer a part of the market that was traditionally reserved for the construction industry. Researchers may be

the first to be aware of this demand for change. It is our role to spread the message.

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