

## BUILDING AND RENOVATION

### NEED TO INNOVATE THE DUTCH BUILDING REGULATION

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#### ABSTRACT

*Increasing dissatisfaction with the regulatory burden, with the (municipal) system of quality assessment and the general loss of knowledge and experience on operational levels led to two Governmental Committees who presented in 2008 their conclusions and proposals. For instance, private certification of the building permit procedure, and to concentrate the knowledge of municipalities in regional intermunicipal bodies for environmental subjects. These proposals will however not change fundamentally the attitudes and behavior of the parties in the building process, owners and users of works. Experiments since show only increased costs and liability.*

*Also more fundamental questions were raised about quality assurance and responsibility in a market driven construction sector. Should the national building regulation set a minimum standard for all relevant aspects because of market imperfections? Or is self regulation feasible? And if so, will it be effective without supervision by a local authority?*

*In 2011 three new studies were commissioned by the Government to address the perceived problems. Two subjects were the economic effects of the changed regulations, and the cost effectiveness of the existing building regulations. The third integral study, executed by the Foundation Expert centre Regulations in Building (ERB) was based on the weaknesses in the knowledge circle of the building sector. It led to proposals to redefine responsibility and liability for all parties.*

*This study states that by an effort of yearly € 100 million, unnecessary costs up to € 1 billion can be avoided and a real quality push will take place in the building and real estate markets.*

*This paper discusses the three studies and the given proposals.*

**Keywords:** deregulation, education, liability, system innovation

#### INTRODUCTION

The Dutch Building Decree has been under discussion for decades. Clear building rules and regulations form an important, even an essential link between the building practice and society, aiming primarily at the availability of safe, healthy, usable and sustainable buildings. How effective building rules and regulations are depends largely on their practical applicability, costs and the extent in which they allow building innovations.

With its Building Decree 1992 the Dutch legislation took an important first step, a system that meets these objectives. As opposed to the traditional building regulations, the Building Decree does not prescribe in detail how to build, but indicates the required performance. This system leaves space for the introduction and application of fresh, innovative solutions.

Now, almost twenty years later, the building regulations have been changed three times fundamentally, initiated by deregulation initiatives. The last one is more and more based on the idea that governmental regulation can be skipped in the

belief that market forces will ensure good performance, in the whole building sector, also for the long run.

Although the Building Decree has proven to be successful in many aspects, various problems have emerged which appear to be structural in origin.

ERB published its first, overall analysis and vision (Scholten, et al.2008) in 2009. One of its conclusions was that the end user – who, as the owner of a building, is legally accountable for it to meet the rules and regulations set – is represented too feebly in the building process, and often does not even play any role at all in the decision-making, especially not in the formulation of regulations. Because of this, the end user could in practice become the loser. As a result ERB assigned a group of experts and scientists to further investigate this issue and to come with a remedy to this undesirable situation.

Other conclusions were that in the public and private sectors two separated circuits of knowledge development took place, and that the building

regulations in their present form insufficiently warrant that public objectives are realized.

At the end of 2011, a quick scan study was realized commissioned by the Government:

To describe the desired change in public and private roles of the involved parties in the building process and in the management and maintenance of real estate.

To sketch a robust future picture of the development and content of the building regulations and the role of the different parties in that process by focusing on the protection of the non professional end-user.

To change the building control process and the process of assessment of the performance of the existing stock to strengthen the position of the end-user in such a way that the realized performance fulfills the regulations and that at the transfer of real estate by owner or tenants the performance will be transparent and guaranteed.

### **THE PRESENT SYSTEM**

As a reaction to the abominable bad housing of city immigrants in the second half of the 19th century the Netherlands introduced the Housing Act in 1901. From then, the municipalities were responsible for the drawing up and enforcement of regulations in the form of local building codes. In the 20s and 30s of the 20th century, the Housing Act advanced the construction of good - and still attractive - dwellings.

After the World War II building contractors and developers operated more and more nationwide. They were confronted with all kinds of different and inconsistent local regulations. In order to rationalize the building process, countrywide uniformity was required. As a first move the Association of Dutch Municipalities issued the Model Building Bylaw. But many municipalities kept adhering to their own building regulations and the call for national uniformity became stronger.

In 1982 the Lubbers-1 cabinet took the initiative that finally resulted in the 1992 Building Decree. The Housing Act stated that from then on municipalities, fire brigades and utility companies were no longer allowed to issue regulations supplementary to or deviating from the Building Decree.

This first Building Decree had a completely different structure. In the old system, the building regulations described specific solutions to many regularly occurring construction problems; innovative solutions were formally not allowed. As the Building Decree states the performance required of complete buildings, constructors could apply both, the existing standard solutions as well as new, equivalent or better.

Between 1992 and 1998 the government worked on a second edition of the Building Decree which was never enforced. In 2003, the presentation form of

the Building Decree was changed at the request of the market into the so-called tables legislation. However, the Dutch government simultaneously introduced a new modeling principle of works that was in conformity with the experience of neither the construction partners nor citizens.

On April 1<sup>st</sup> of 2012 a revised Building Decree 2012 came into force after a long development struggle. It integrated elements of the Building Decree 2003, of 418 municipal building bylaws, the Decree on fire safety structures in use and the Decree on road tunnels. The political goal was to reduce more than 25% of the volume of all clauses and to diminish the freedom of local authorities to decide about exemption of requirements for renovations.

Since its publication in 1991, the Building Decree has now been changed 31 times, often minor changes and two mayor revisions as described above.

The Building Decree does not cover the whole spectrum of regulations relevant to building. For specific buildings and safety and healthy rules, the specialized Ministries published their own technical regulations.

Besides these, the EU regulations for construction products were introduced, due to the required free movement of goods and reduction of use of energy.

In order to reduce the burden of too many regulations and organizational fragmentation the Dutch government recently decided to implement three important measures:

- a) one 'environmental counter' for dealing with 'environmental' related permits (the General Physical Environmental Rights Act ), but at the start of the Government Rutte I in 2010 a more rigid law reconstruction in the Environmental area is foreseen;
- b) bundle all knowledge at the enforcement level by combining the responsible local services at regional level, implementing the advice of the Mans Committee (VROM 2008);
- c) organize the fire departments regionally (Act on Safety Regions).

### **A necessary review of the system**

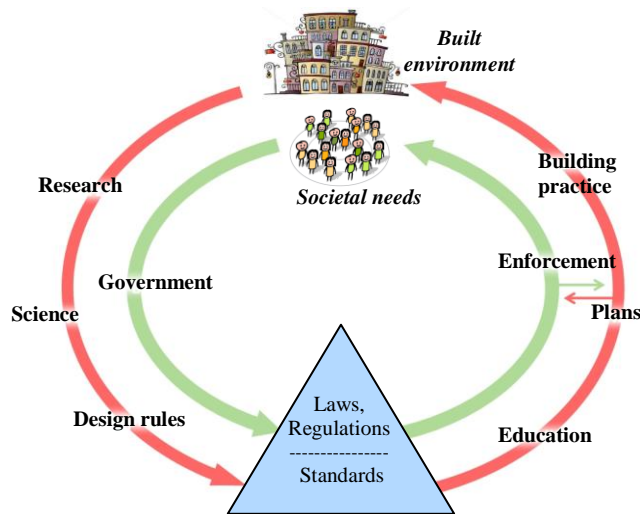
The three recent measures are administrative and organizational answers to problems that are rooted deeper. Both, the public legislation and the privately developed system of Building Standards form a part of a knowledge system that is necessary to realize and manage safe, healthy and sustainable buildings. That system should function properly, which is not the case at present. The regulation is more effective, when it is developed in line with this knowledge system. Everybody involved in buildings, construction and its management, must be able to properly understand, interpret and apply the regulations.

This knowledge system should also facilitate possible adaptations and the development of new regulations. Of course, these regulations should comply with the practice of design, construction and use. The lessons learned from practice should in turn lead to research and improved regulation. Attention must be paid to the transfer of knowledge as well as to the restructuring of the regulations.

### The cycle of knowledge

The skills of designing and constructing good and reliable buildings are rooted in building science. This has largely developed empirically and is continually developing further. With a view to practical applications, scientific knowledge has

been incorporated in design regulations, governmental rules and regulations and standards. We may assume that buildings are sufficiently safe, healthy and sustainable when architects adhere to these regulations. Naturally, the same counts for owners and users when managing and running their real estate. Should they not do so, we ought to change the regulations or stimulate people's adherence to the regulations. Occasionally, or in case of technological innovations, people should be able to deviate from the details in the regulations without necessarily endangering safety, health or sustainability. We have depicted the process outlined here as a circle of knowledge (see Figure 1):



The *public* learning track (green): public requirements are translated into rules and regulations through legislation, enforced according to public law by means of a licensing system, general terms and conditions, or sanctions recorded in the Housing Act, Municipalities Act and the Provisions of administrative law; The *private* learning track (red) runs from research and science, through technical specifications and known solutions which are transferred in training programs, leading to professional practice. Some of these specifications and agreements have been laid down in the Standards and assessment guidelines.

Figure 1. Knowledge circle (Scholten, et al. 2010)

Building regulations combine the two tracks to become crossroads. Knowledge of the Standards and their background is also essential for enforcement, and knowledge of rules and regulations is just as important for education and training programs.

On the basis of the ideal model we are able to clearly illustrate the practice related hitches. Figure 2 charts these hitches.

The first general problem is that the various actors in the private-law circle of learning work totally independently from each other. Universities, research institutes, schools for professional training, commissioning clients, designers, engineering consultants, building contractors, fitters, suppliers and consumer representatives, they all adhere to their own policies, focusing specifically on their direct self-interests, and without much coherence.

The next problem is caused by both a highly fragmented sector and the fact that not a single party individually obtains a competitive advantage from investing in the development of

communication systems and therefore chooses not to do so, however these systems are necessary to structure and improve mutual understanding in the sector. Centralized communication systems are no-one's priority, and no 'central market superintendent' exists who could organize this. And then there are other factors. We refer to the characters in the black dots of Figure 2, described in (Scholten, et al. 2010). We summarize the importing ones. In order to make public-law rules and regulations and private-law agreements match, the two learning tracks on the left-hand side should be linked up with each other. At present there is no interaction whatsoever.

Standardization must be based on research. The performance requirements must be based on measurement, determination or calculation methods. At present, unfortunately, many terms and conditions, and standards are insufficiently based on science. Due to the lack of proper financing, universities have little interest in the methodology and modeling necessary to formulate rules and

regulations. The technological institutions such as TNO (Netherlands Organization for Applied

Scientific Research) largely depend on occasional commissions from the government and industries.

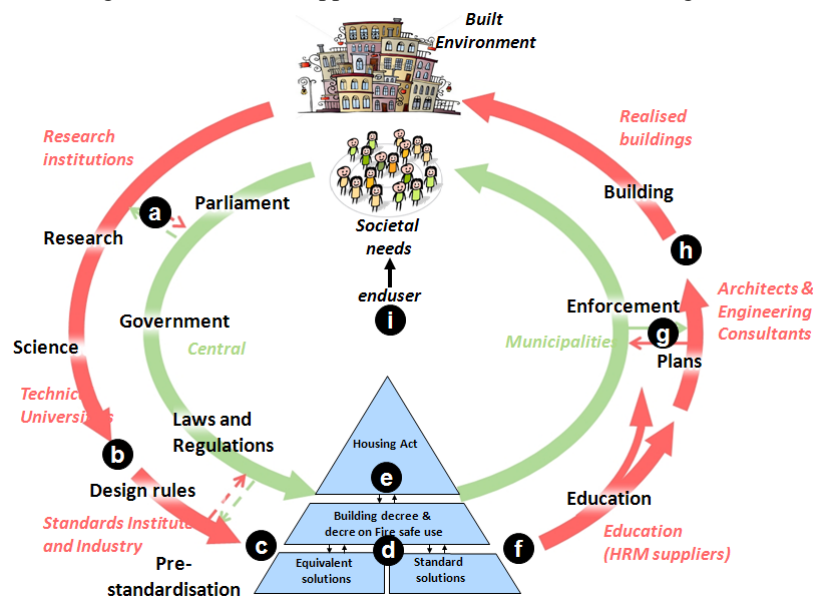


Figure 2. Hitches in the knowledge circle (Scholten, et al. 2010)

This is the reason why they miss the long-term stamina necessary for the development of scientifically sound rules and regulations or standards.

The knowledge on which the development of regulations and standards is based has been insufficiently recorded and managed in the present system. After the successful completion of a regulatory project, everybody should be able to easily find the relevant background information with a view to clear objectives and an unambiguous interpretation, and support of the equivalence of possible, fresh solutions. Now, this knowledge seems to ebb away to such an extent that even the responsible bodies themselves do not always understand their regulations.

Individual private-law regulations, such as standards, have been drawn up based on different disciplinary backgrounds, for instance: by constructors, experts in fire safety, and those in building physics or materials specialists; also the European standards use other words than the Dutch regulator; so these regulations do not match nicely. One result is a differing and inconsistent use of language. As the Building Decree (2012) refers to such regulations, unavoidable inconsistencies develop in legislation. The legislator's use of language is not that of the standardization committees, while neither speaks the language of the man on the building site, the performance approach requires a level of abstract thinking which is not used on the shop floor; specialists with secondary education only understand problems by way of practical solutions. Would regulation be consistent and translated in shop floor language, the

correct application of regulations would improve greatly.

The scope of application of building regulations should probably be extended. According to the original Housing Act, building rules and regulations were meant for the safety and health of the users of a building. Later, as an effect of these, regulations were added with a view to its usability and energy efficiency, later followed by accessibility and sustainability and by April 2012 also by fire safe use, demolition, safe maintenance and sustainability. Up to now, economic and cultural aspects and the prevention of criminality have been included only to a small degree. However, the regulations which have to promote the well-being of construction and aid-workers, such as firemen, have been laid down in the Law on Conditions at the Workplace; one can only find them implicitly in building regulations. Although, the construction industry is one of the most dangerous, unhealthy and energy-consuming economic sectors. Surely, a building application or process should not only meet the building regulations, but also satisfy the Commodities Act: elevators and appliances), the Environmental Management Act, the Nuclear Power Act: ionization alarm, Police Act, Records Act and the Law on Conditions at the Workplace. With such complexity it is not surprising that people experience regulations related stress.

Rules and regulations only form a minor part of the curricula in secondary and tertiary professional education and universities. This creates an important gap in knowledge both within industries and within law enforcement organizations of the government. It seems as if people no longer see

how closely the administrative and building laws as well as technical regulations are connected.

Preventive assessment to meet the public law is done only in the design stage of a building. So, one cannot be sure that buildings realized actually comply with the relevant regulations.

In today's building processes the end user, often the owner (to be) of a building, hardly plays a role. As the end users often are parties differing from the commissioners of buildings (the developers and investors), their specific interests will generally be insufficiently represented in the design and construction stages. Therefore, they will have to rely on the public rules and regulations to protect their interests. Many commissioners completely ignore many kinds of aspects that, for a society, are desirable and beneficial in the long run – think of the accessibility of buildings for persons with functional limitations, or the adaptability to various other uses of a building. If these requirements have been carefully dealt with in their design and construction, the layout of buildings might have to convert less often, the risk of vacancy might be lower, and early demolition due to their being unfit for purpose might be scarcer. The only way in which to realize this societal goal is for the government to list minimum regulations and enforce them.

### **PROPOSALS FOR SYSTEM INNOVATION**

The starting point is the enforcement of regulations the societal usefulness of which has been proven. To diminish the burden of overregulation we can for each aspect present the rules on three different assessment levels. That is needed for three areas of application: the newly built buildings (construction works); the renovation/-refurbishment/transformation and the existing stock. For each of these areas an own set of objectives and rules might be necessary and logical.

The starting point should be for all sub aspects that the objectives of regulation are quite clear and are discussed between all parties concerned, not in the least with the end-users, and are formulated clear and concise. This is functionally a governmental task and should be taken up before anything else.

The translation of the objectives into regulation for constructions and buildings is clearly a task of the professional market parties.

A first assessment level is meant for easy elaboration of 'standard solutions'. We assume that possibly 80% of the building plans or the existing buildings are or consist predominantly of 'standard solutions'. The middle level more or less resembles or would be an improved Building Decree 2012 that focuses on performance. The proposed third level concerns building works in which unconventional and innovative solutions are to be implemented, using a probabilistic approach in assessment.

Should an applicant differ in opinion on whether a proposal meets the level of the standard solutions or the level of the ordinary assessment according to the performance requirements of the Building Decree, the third level would then provide the possibility of assessment according to the objectives regarding safety, health, usefulness, energy efficiency and sustainability. In that way discussions with regard to technical content need not end in judicial disputes.

For many people the introduction of these two new levels will substantially diminish the burden of overregulation. By standard solutions one could implement the greatly simplified regulations instead of those of the Building Decree 2012. While, at the third level, one can judge innovations against the formulated objectives, outside the known territory of solutions and construction rules.

It is in no-one's interest to enforce a regulation that is not well understood. The three level structure will improve the practical use of the regulation and will promote the legislators real objectives: the enforcement of safety, health, usefulness, energy efficiency and sustainability. That is how the regulation is linked with objectives.

Because of the lack of knowledge the development of the objectives and structure of three levels and three areas of application should be prepared by a "Knowledge Institution", financed by the Government and the market parties together (PPP). In this institution the few experts there are at the moment will join forces to organize and prepare the outline of the objectives and to oversee the development and elaboration of the structure of regulation. Within the Knowledge Institution all data behind the regulations will be concentrated and stored, accessible for all parties concerned, for now and in the future.

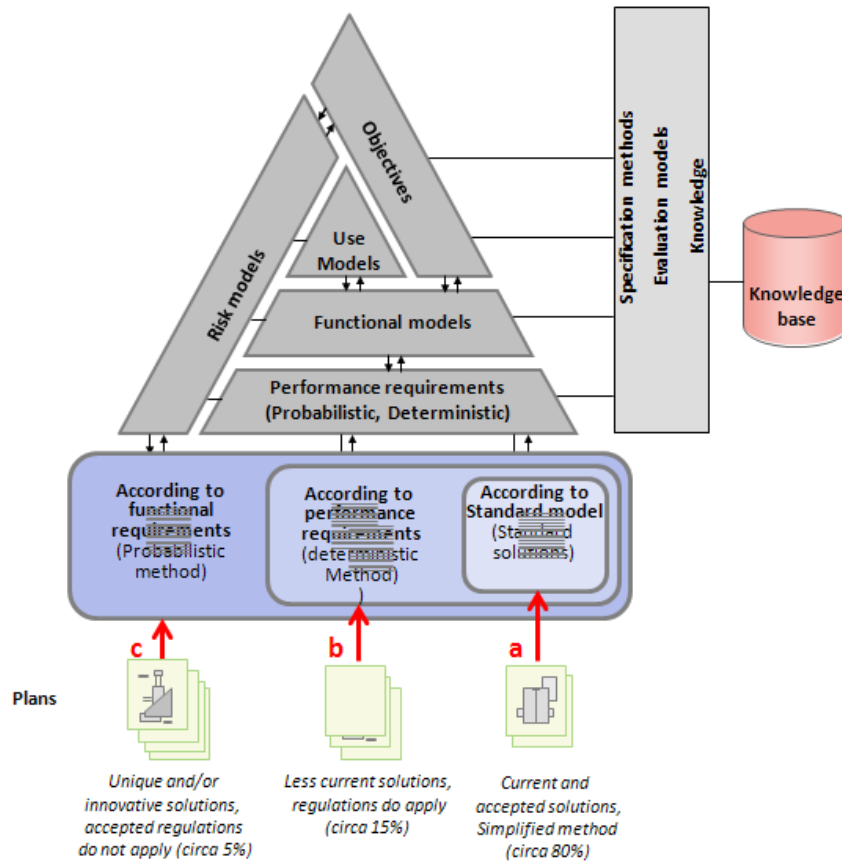
ERB proposes also to improve the safeguarding of the regulation related knowledge. Together with all those involved in the building process - from science, knowledge institutes, education, architects and engineering consultants, to the actual builders and the real estate sector - we must try and form a secure chain of knowledge with properly linked up sub processes. Only with a properly functioning knowledge system can we rely on the building sector to meet the objectives which we may expect from it. The foreseen Knowledge Institution will form the focal point.

Procedural innovations are required. We need to attune the three assessment levels. The accepted standard solutions will be assessed according to the performance requirements as laid down in the second category and the question whether the performance requirements themselves meet the objectives set, is answered by means of the risk approach which we will apply in the third category. The elements which the three levels share at a generic level: objectives, risk models, user models,

functional models and performance requirements, prepared by the Knowledge Institution and discussed with all parties concerned.

The general structure of rules and regulations as presented below, in Figure 3, has been depicted in the form of the grey triangle. This part of the

structure ensures that the system remains consistent, also when objectives change or new objectives, rules or constructions are introduced. The parts relevant to applicants and assessors are represented in blue.



**Figure 3.** Presentation of the firm structure of development of building regulations (Scholten, et al. 2010)

### Explanation of captions used in Figure 3

**Objectives.** Regulation must be the outcome of a single coherent system of objectives. These objectives are the foundation of the regulatory system and should be well defined and written down.

**Risk models.** Absolute guaranties for safety, health and sustainability cannot be given. Objectives always deal with *possibilities* and *risks*. They deal with the possibility of collapse, the risk of permanent physical injury or death, and the possibility of environmental damage. The present regulation often provides strictly limited values for these possibilities and risks. Does it mean that exceeding these limit values immediately results in unsafe and unhealthy situations or limited sustainability? Depending on varying circumstances or the use expected, a building may still, in an acceptable way, meet the objectives laid down.

That is why we will again have to standardize the whole system of regulations, standards and limit

values according to the objectives using risk models and the theory of probability. These models must become an integral part of the regulatory system. This too would greatly simplify regulation.

**User models.** We can only translate objectives into specifications for buildings if we also know how these are going to be used and who their end users will be. Models are necessary because of the variation of use in practice. That is why there is a need for realistic rules and regulation based on *user models*. By projecting these user models on the model of a building, in terms of floors, working spaces and partitioning elements, we then can list functional and performance requirements.

**Functional and performance requirements.** Functional requirements describe the requirements of a building in a functional sense.

The performance requirements for a building and its parts depend on their function and use.

**Modifiability.** Naturally, the rule and regulation system reacts to ever changing opinions in the society. In the past decade, for instance, terrorism,

climate change and sustainability moved to top positions in agenda. Undoubtedly, new requirements and objectives will be added in the coming decades which cannot be foreseen for the moment. We should be able to change the rules and regulations as easily as possible, with minimum economic effects for users and real estate managers, while retaining previously acquired rights.

*Knowledge.* Many rules are clear-cut. But it is not always clear why certain rules exist or why others *do not*, or why specific terms are used. Often, the persons involved have stored this background knowledge in their minds, but it is not at all or hardly available to third parties. That is why this knowledge has to be publicly recorded and everybody will be able to properly interpret and apply this.

The government wishes to withdraw from markets that might just as well be left to trade and industry, as underlined in the report of the Dekker Committee 'Private whenever possible, public whenever required'.

Differing from most of the other industrial sectors, the knowledge process in the building sector is highly dispersed, as has been shown earlier and depicted in Figure 2. Most of the parties only take responsibility for their own part in the process; nobody feels any overall responsibility. The chain of responsibilities is poorly organized in the building sector and the process is highly fragmented. This might be different in other countries, but it is the case in the Netherlands. We are highly dependent on the smooth cooperation of all parties. This has its advantages but also many disadvantages.

The system of regulations and standards forms an essential link in the knowledge process, so we should continue to invest in it for future development and maintenance. However, that does not happen sufficiently. In Figure 4 we have indicated several points of necessary improvements in the knowledge cycle.

The present public system of assessment against the building regulations is aimed at the granting of an "Environmental" permit in case of a construction or renovation project. But the authority will never be responsible and will never guarantee that the building fulfills the regulation. The authority does not have the duty or the capacity to check the whole building process. Many people have the false hope that the authorities will guarantee that the performances of the building will be in line with the regulations and the market wishes. Reality is that most of the buildings do not fulfill the regulations, a lot of mistakes are made and that contractors do not feel the responsibility and liability. They say „we have a permit and it is accepted by the authorities”.

The owner of real estate is responsible that the building will be in line with the regulation. The

authorities should issue penalties in case of non compliance. But the authorities do not have the manpower and the knowledge to do so. In reality we do not know whether buildings comply or not. The owner does not know what the performance of his real estate is, nor the requirements. When transferring to a new owner or tenant no one knows what quality is sold or rented.

To break through this false chain we propose the following:

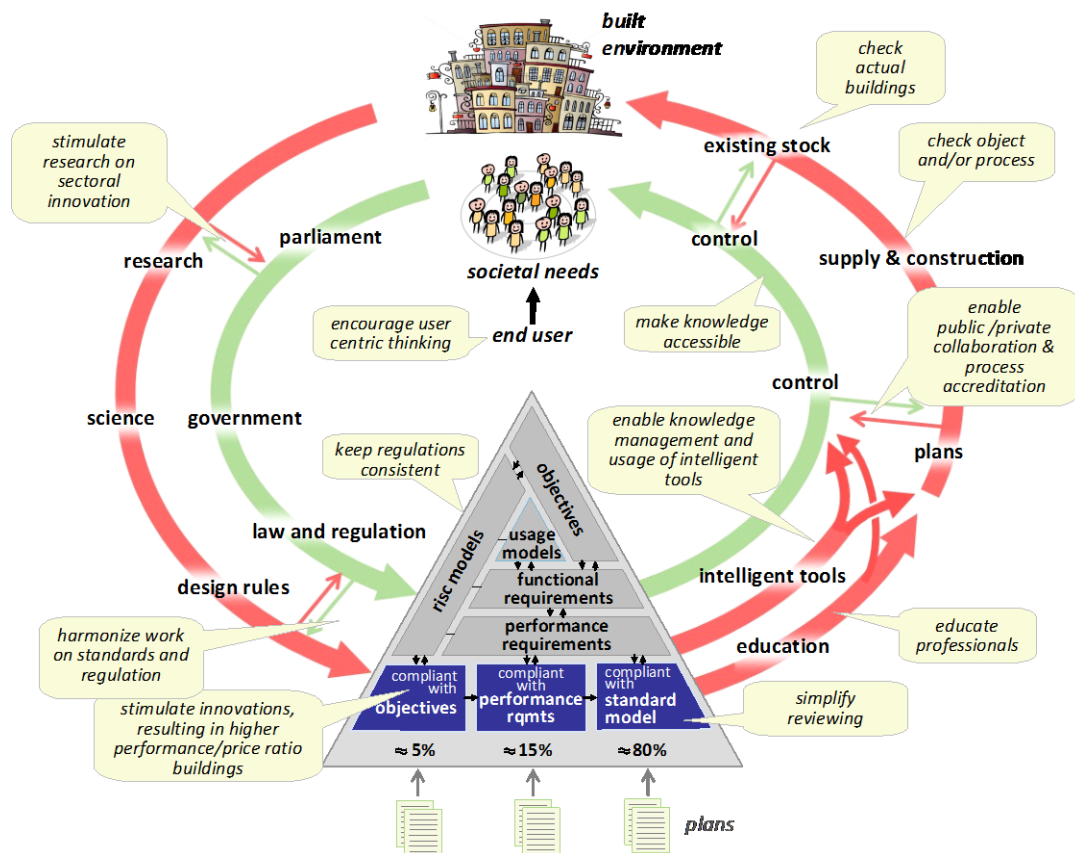
- 1) Technical assessment of the construction project will no longer be necessary beforehand, but just before occupation of a building it should be clearly stated and documented by a recognized, independent body, that it meets the regulation; if not, the use of the building will be forbidden; in the environmental permit this clause will be standard implemented. How much documentation is necessary depends on the level of regulation that is applicable (simplified solutions, performance based clauses or probabilistic methods).
- 2) The regulation for the existing buildings will be based on the Civil Law so that liabilities are clear and people can submit objections and complaints at the Civil Court Chamber; experts of the Knowledge Institution can advise the Court on the technical content.
- 3) When transferring real estate (sale or rental; conveyance) a guaranteed documentation of actual performance will be handed over for which the seller or landlord is liable;
- 4) All parties involved, also the normal man in the street, can complain at a new Body in case of unsafe or unhealthy building in the neighborhood.

By changing the system in this way and by changing the content of the building regulations and the process to develop and maintain the regulations as mentioned before, self regulation of the market will become possible and a knowledge push will take place. All parties concerned will probably take insurance so they can bear their responsibilities and liability. Not the law dictates the duty to insure, but the market system will realize that by itself. That also will strengthen the quality chain. This innovated system will give an upward impulse to realize real performances to the level that the market expects. This system will only function when the knowledge chain is closed.

The implementation will create new functions. Acknowledgement should be organized for independent technical-legal arbitration, so that for parties that have a conflict on technical points, the dispute can quickly be settled on technical-legal arguments. The formal road of objection and appeal according to the General Administrative Law is much too cumbersome for this and can be evaded.

Furthermore, knowledge should be easier accessible and actively promoted through training, publication,

the Internet and knowledge systems, thus transferred



**Figure 4.** Vision on future development of building regulations in closed and linked public and private law chains of knowledge (Scholten, et al. 2010)

to professionals in the building chain as well as to the law enforcement organizations.

Moreover, emphasis could shift from design to process assessment, and possibly to process certification. That is to cover the complete process from design to the building process, including quality management and guarantee after acceptance/completion. This quality related thinking (ISO 9001) has been accepted in many sectors of industry, but what would this mean for the structurally so fragmented building sector? The ultimate test in quality related thinking is customer satisfaction, but as already stated, the actual customer, the end user, generally, takes no part in the Dutch building process, except the scarce homebuilding principal. Besides, designers, contractors, suppliers, and authorities have shared responsibilities: nobody feels accountable for the whole process. Although, integrated contracts are becoming more popular - partly as a consequence of the need of integral accountability - they still only constitute a small part of the present market of construction and refurbishment.

With a coherent approach also methodical improvements can be implemented and monitored leading to a more consistent practice that, by means of reference, can become a part of the same chain of knowledge.

#### ECONOMIC AND SOCIETAL RELEVANCE

Structured regulation has a key role in translation of the essential needs regarding the built environment. As we are all regular users of that built environment, whether it be living, working, recreating or travelling, that regulation is essential for our society.

However, everything has its price. When we look specifically at the development, learning, applying, enforcing and implementation of the rules and regulations – which we have symbolically represented with the two knowledge circles in Figures 2 and 4 – then this refers to a process which involves thousands of specialists on a daily basis. There are no exact figures on this commitment of people and costs.

The construction, management and maintenance of real estate involve substantial amounts of money. Some expenses directly contribute to the quality of the built environment; other expenses are needed



solely to apply regulations, so at the best they contribute indirectly to the safety, health and sustainability of buildings. The latter expenses ERB estimates for a big part unnecessary.

Moreover, costs arise when a design or existing work does not meet the regulation, because the applicant simply knows them insufficiently and the regulation is not enforced. At present, enforcement takes place mainly by means of random checks based building plans on paper. Enforcement should take place much more on the basis of buildings actually constructed, specifically with a view to the real risks for which this regulation has been written.

In the ERB study report it is demonstrated in a conservative estimation that by implementing the proposals every year more than € 1 billion can be saved on a turnover of € 20 billion. Other benefits will be:

- 5) Better and more understandable building regulations;
- 6) A very simplified process to get the environmental permit;
- 7) Better environmental performance ;
- 8) Less disputes;
- 9) More satisfied people in relation to the quality of buildings.

### THE STEPS TO TAKE

The ERB report 'After Dekker' describes actions to be taken to innovate the building regulations and the building assessment system. First of all the parties concerned have to sign a covenant that outlines their intentions, their duties and their rights. The government has to provide the starting capital to finance the creation of the independent Knowledge Institution and the first steps of the renewal of the system of building regulations (stating the objectives). Also the government has to decide the necessary changes in the laws and the moment that the environmental permit system will no longer need the technical assessment of a building plan, but instead the owner and contractor will have to declare the performance at the occupation moment.

When those decisions will be taken, all other improvements will follow as the logical outcome of the new structure. All parties involved can finance yearly the Institution from their savings every year, estimated at least the € 1 billion predicted efficiency improvement.

At the moment the Parliament is in discussion with the Ministry about the future of the building regulations and the innovation that is needed. The reports of Actal, EIB and ERB are therefore the starting point. The need is higher because of the political discussion about the limited quality of the Building Decree 2012.

### ACTAL AND EIB-STUDIES

The Actal study is complete in line with the ideas of the ERB-study. The differences are that the ERB-study is comprehensive, both in regulation steps as well as in process steps, with an activity plan, time schedule and cost reduction estimation. The Actal study only gives suggestions without further motivations and conclusions.

The predominantly monetary EIB study calculates costs and benefits of rules and regulations. They focus on rules and regulations that they define as unnecessary, because they are not cost effective. The study sees balconies and sheds as unnecessary; houses are cheaper without. The same applies to high standards for energy saving. The calculation of the savings of money is too high: it is not related to the effects in reality (e.g, 10% less balconies, because the majority of houses still get them) but takes the costs of all balconies because they are not longer an obligation. For other aspects they argue that the rules are not effective and thus unnecessary (the measurements of staircases). We think this is an argument for better regulation, not doing without. In total the study counts to 0,5 billion cheaper construction without these rules, which is only theoretical and highly overstated.

### INTERNATIONAL EXPERIENCES

In a lot of countries discussions are ongoing about the system of building regulations, deregulation, and the position of the parties in the building process, and to attain building of adequate quality faced by the end users.

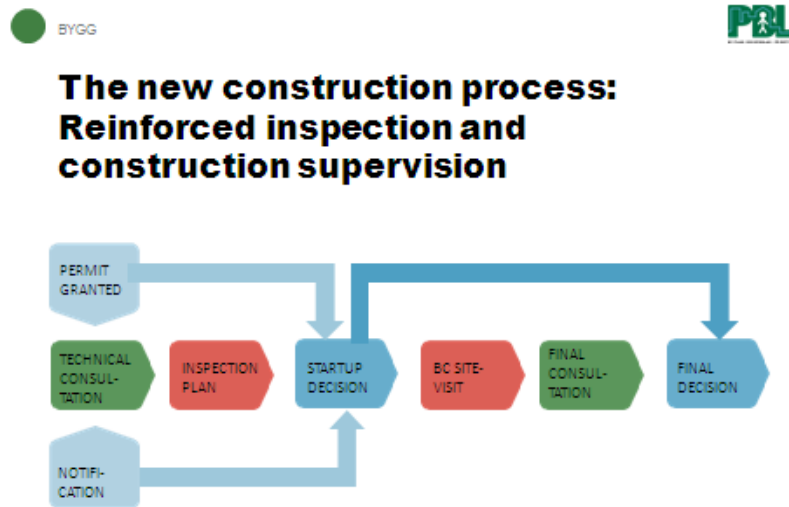
In Sweden the system of only private certification to the building regulation is deserted. Sweden had bad experiences regarding the quality that was built. And as a result of that the Swedish Parliament changed the Planning and Building Act in May 2011 (Stig, 2012). The major changes are about the construction process with reinforced inspection and construction supervision.

The new construction process involves the introduction of both - new elements and rules that are extended and clarified. New stages of the process are the start permit, site visits and final consultation and the use permit for the building to be used. The content in the technical consultation and the inspection plan requirements are clarified.

Building regulatory systems in Iceland are enacted to protect the interest of the general public and are run by the government – central, provincial, state or municipal, depending on the structure of a country government and the authority of particular levels of the government. In Iceland, there are only two levels of government; central and municipal. The central government makes policy decisions and is in charge of developing the legislation and building regulations

and the municipalities, through their building officials, enforce, to a great extent, the building regulations. A new law on construction was

developed, introducing mayor change. The new law was finally passed by the Parliament in 2010 and a



**Figure 5.** The new construction process involves reinforced control and construction supervision

new government body, the Iceland Construction Authority (ICA) was formed. The ICA is responsible for overseeing laws, regulations and rules in regard to building regulations, fire safety and electrical safety. (Karlsson and Tomasson, 2012)

According to the new Law on Construction, all designers, construction managers and master builders must be certified and have a quality assurance system as from the year 2015. The ICA is also to produce Inspection Manuals and all official control of building plans and construction works that are to be inspected according to these. The manuals must be developed in a wide range of building regulatory fields, such as stability, fire safety, energy efficiency, universal access, health and noise, to name some fields. By the year 2018 all inspectors must be certified and inspections must be carried out by accredited inspection firms or an accredited municipal building authority.

This regulatory method has been quite successfully implemented in a number of fields, such as

automobile safety, ship safety and electrical safety, to name a few inspection regimes overseen by the authorities. However, it must be seen as a considerable challenge to attempt such an implementation in the area of construction, since buildings are usually not mass produced and each building is a unique production.

In Australia problems arise with private building control and innovative techniques (Chateau, 20012). Fire Safety Engineering and Science continues to evolve and afford benefits to society, however, given ambiguity of performance based approval processes and a competitive market, the regulatory framework and its operational structure must be robust and sufficient to mitigate the risks associated with the failure in full or part of both reform initiatives. Knowledge problems rose because privatized certifiers do not have the skill to judge fire safety engineering solutions.

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