



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

## **The Implementation of BREEAM in a Construction Company**

A study on how an environmental classification system affects the company's organization

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## **Abstract**

Sustainability and greening of industry have become a part of the construction industry where environmental classification systems have become more common today. A case study research with qualitative interviews was conducted with a large construction company in Sweden in order to investigate the implementation of an environmental classification system, BREEAM, and how it affects the organization. By collecting the view from both top managers and construction projects, a broad view within the company is presented. The paper provides a discussion based on theories within sustainability, organizational change and standards. The overall view is that BREEAM adds an additional value to the buildings, and generates a more environmentally aware organization. The BREEAM process is not integrated into the construction process, which has contributed to a slow implementation process. This can be changed through increased support, evaluation of the system and clearer communication between different levels and business areas in the organization. Thereby, the paper gives a contribution to the construction industry, in the field of environmental management.

**Keywords:** *BREEAM, environmental classification system, sustainability, organizational change, standards, construction industry*

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<sup>1</sup>This master thesis was conducted in cooperation with a student at the Department of Civil and Environmental Engineering, Chalmers University of Technology. Double publications, an academic paper and a technical report, were printed with similar content at the two universities.

## Introduction

Sustainability and greening of industry have become more and more discussed and scrutinized during the past decade (Toben, 2011) and have become influential features in modern society in the twenty-first century. Although many people thought the environmental focus was a passing trend, it has proven to be here to stay. Companies meet an unprecedented challenge in order to meet environmental expectations from the surrounding world (Esty & Winston, 2006). A lot of financial investments and resources are devoted worldwide to reduce the environmental impact. In the year 2010, the total cost of environmental protection in Sweden was nearly 11 billion SEK, an increase of 1.5 billion SEK from the previous year. In the industrial sector, the investment cost to improve the environmental impact has increased from 3 billion SEK to 4.5 billion SEK from 2009 to 2010 (SCB, 2011).

The construction industry has accepted the environmental challenge and started to adjust the process of design, building and operation in the 1990s to mitigate the environmental impact (Crawley & Aho, 1999). This was especially implemented in industrialized countries such as Canada, USA and the European countries (Skopek, 1999). There is an excessive potential for the construction industry to affect the environmental issue (Robichaud & Anantamula, 2011), since the construction industry contributes a significant part of the environmental impact in the community due to the high turnover of material and energy (Kretsloppsrådet, 2012). However, during the last years, from 1994 to 2008, the environmental impact from the construction industry has decreased due to larger environmentally friendly efforts (Kretsloppsrådet, 2012). In the middle of the 1990s there were only occasional Environmental Management Systems (EMSs) on the Swedish construction market and Environmental Classification Systems (ECSs) were not available. The implementation of EMSs and ECSs in the Swedish construction industry has been developed and in 2008 many systems were available on the Swedish market (Kretsloppsrådet, 2012).

In order to advance the processes in the construction industry, environmental standards have been developed in an increasing number all over the world (Haapio & Viitaniemi, 2008). For example, the number of certified members of the EMS ISO 14001 has increased by over 500 percent over the last ten years and had over 4000 certificated members in Sweden in 2011 (Certifiering, 2012). The EMSs further developed into different ECSs, with a first start in the early 1990s (Skopek, 1999). The Nordic countries have been on the front edge of the sustainable and environmental construction process, which has made Sweden to be a notable country regarding EMSs, where 65 percent of the companies in the construction industry are certified according EMSs (Gluch et al., 2011). In recent years, the UK and the US have developed their own ECSs; BEEAM (Building Research Establishment Environmental Assessment Method), and LEED (Leadership in Energy and Environmental Design) (SGBC, 2012). In Europe, Green Building is another well-known ECS. BREEAM was the first ECS used in the construction industry to give a holistic approach of the environmental impact of the construction process; design, building and operation (Crawley & Aho, 1999).

In Sweden, the discussion about the environmental impact from the construction industry started already in the 1960s (Ekonomifakta, 2011). In 1969, the first law

regarding environmental protection was presented, called “Miljöskyddslagen” (Notisum, 1999). However, it was not until the 1990s that the environmental actions started in Sweden (Ekonomifakta, 2011). The larger construction companies in Sweden have focused more on sustainability and the environment for the last couple of years, as the demand for sustainability in the construction industry has increased. Furthermore, it has become customary to use ECSs, such as BREEAM, LEED and Green Building, but also “Miljöbyggnad” and “Svanen”, Swedish adapted classification systems. The ECSs often include higher environmental demands than the Swedish law and standards require. However, there are still Swedish standards that have to be met during the construction process, which are included in the different ECSs in Sweden.

In order to meet the demands, the construction industry needs to change and adopt new working procedures which take the environment into consideration. The environmental change process is in line with the expectations from the surrounding world, and gives the organizations credibility and legitimacy (Dunphy et al., 2007). The stakeholders, e.g. investors and buyers, require environmental solutions in the construction industry (Esty & Winston, 2006). Therefore, the construction companies need to adopt ECSs in order to be strong and competitive on the market. There is a strong connection between the construction industry and the environmental issues and this is demonstrated through the large construction companies’ investment in sustainability and ECSs. ECSs are relatively complex and require changes at different levels in organizations and they also require new competence. The sustainability within the construction industry has increased to an international discussion and the ECSs are now accepted in the industry (Haapio & Viitaniemi, 2008). ECSs are a common research area today and many scientific journals have published several papers about the topic. However, literature concerning the methods of the implementation of an ECS in an organization is limited.

BREEAM (Building Research Establishment Environmental Assessment Method) is the world’s oldest and leading ECS on the market (BRE Global, 2009) and was developed in 1990 in the UK (SGBC, 2011). However, BREEAM is an ECS that has rather recently been introduced in the Swedish construction industry, and thus is still in a developing phase. In this paper focus is on one well-known construction company in Sweden, NCC, and how the ECS BREEAM is implemented in the organization. It is a challenge for NCC, both organizationally and practically, to implement the ECS in the construction process and acclimatize the construction process to the standard since the ECS is additional to the ordinary process. The implementation of BREEAM will be the theoretical perspective of the paper since the adoption to a standard is a challenge. Implementation of ECSs can be seen as a complex organizational change and a rather new phenomenon within the construction industry. This paper looks deeper into the area of how the implementation of an ECS affects a construction company’s organization, in practical terms. In order to study the area more closely, a main research question supported by three sub-questions was formulated.

How does the implementation process of the environmental classification system BREEAM, affect and change the construction process and NCC's organization?

What is the perceived value of introducing BREEAM to the organization?

How is the implementation of BREEAM carried out in ongoing construction projects?

How is a construction project affected by the implementation of BREEAM?

The purpose of this paper is to contribute new insight concerning the implementation of an ECS, BREEAM, within a construction company. The company's organization and construction projects have been examined in order to see how they have been affected. Both the view from top management and the projects will be presented. The studied projects are office and/or retail buildings and are located in different parts of Sweden.

The remaining paper is structured accordingly; firstly the theoretical framework is introduced; sustainability in the construction industry, organizational change and standards, followed by a presentation of the methodology. Thereafter, the setting is presented, which consists of a short description of the company NCC and the ECS BREEAM. Next, a presentation of the findings from the interviews is described, continued by a discussion where theory and findings are connected. Finally, the conclusion and recommendations are presented.

## **Sustainability in the construction industry**

Global sustainability can be defined as "the ability to meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003 p.56). The construction industry has adopted the sustainability concept for the last twenty years (Gluch et al., 2009) and it has shown that sustainable development contributes to economic, environmental and social benefits for organizations (Hart & Milstein, 2003). Therefore, sustainability is the appropriate path forward for organizations as well as the responsible and ethical choice (Dunphy et al. 2007). Sustainability is especially important for construction companies since they consume large amounts of natural resources (Gluch, 2005) and operate in an industry which is highly regulated by societal, political and economic forces (Stenberg & Räisänen, 2006).

Sustainable construction (also known as green building and green construction) considers the economic, environmental and social issues as the sustainable development mentioned above (Robichaud & Anantatmula, 2011). The aim of sustainable construction is to create and operate environmentally and ecologically friendly buildings in order to produce healthy and resource efficient solutions (Kibert, 2008). Moreover, sustainable construction focuses on the environmental responsibility throughout a building's whole life-cycle (EPA, 2010). It does not result in a new

building process, but rather in a modified process that considers the environmental aspects (Toben, 2011), e.g. climate change, chemicals, energy, water and land use (Esty & Winston, 2006).

In order to reduce the environmental impact, i.e. to use sustainable construction, the construction companies have started to use ECSs (Skopek, 1999). The number of ECSs has grown on the construction market and they have become a part of the construction process (Gluch et al., 2011). The construction companies' environmental effort has become more intensive and the range has spread from only a few environmental focus areas to more multifaceted ECSs (Gluch et al., 2011).

ECSs contribute to competitive advantages and environmental marketing for the construction companies as well as reduced operating costs and lower maintenance costs for the property owner (Ball, 2002). However, an increased cost can be associated to ECSs (Robichaud & Anantatmula, 2011). Initial costs such as certification and registration, special investigations, material choices and administration are examples of cost outlays in an environmental project. The costs are predicted to decline in a long term perspective when the environmental process has become more incorporated in the organizations (Robichaud & Anantatmula, 2011). However, bureaucratization and administration will remain or even increase due to more extensive processes (Gluch et al., 2011).

## **Organizational change**

“Organizations change all the time, each and every day” (Burke, 2008. p.1). The definition of change is extensive; theories about change have been developed over the last 100 years and are still in constant progress of further development (Dawson, 2010). How to organize work and manage change are essential for organizations in order to survive in a world that is in constant change (Burnes, 2011). According to Moran and Brightman (2001), the change process is not linear, there is often a diffused defined beginning or end, and therefore a change can be confusing and sometimes endless. Furthermore, a change process does not need to be planned, it can be implemented and developed through natural forces, both internal and external (Bakka et.al, 2001).

Change management is the process of renewing structure, direction and capability of an organization in order to please the ever-changing needs in the surrounding environment (Moran & Brightman, 2001). Moreover, change management can also be defined as a “systematic process of applying the knowledge, tools and resources needed to effect the change” (Potts & LaMarch, 2004. p.16). A change process can be complex and challenging for organizations and it often involves multiple levels of the organization (Whelan-Berry & Somerville, 2010). According to Burke (2008, p.23), a “process [change process] has to do with how the change is planned, launched, more fully implemented and once into implementation, sustained”.

The business climate today requires that organizations are able to change in order to survive the increasing competitiveness, which has become a part of corporate life (Potts & LaMarch, 2004). “Organizational change can be defined as new ways of organizing and working” (Dawson, 2010 p.11), and should provide the organizational

members with a new vision for the future (Burke, 2008). Change is driven from different sources; either from inside or outside the organization (Potts & LaMarch, 2004). These sources can be seen as “triggers”, which are factors that affect the organization externally or internally. Examples of triggers are; globalization, laws and regulations, investors, suppliers, competitors and employees (Dawson, 2010; Hoffman, 2000). An organization can be seen as an open system, being in constant interaction with the surrounding environment. Today, the external environment changes more rapidly than a few decades ago, which increases the need for a larger understanding concerning organizational change (Burke, 2008). Furthermore, organizations need to be more flexible and accommodative to the surrounding environment (Bakka et al., 2001). Therefore, influences and initiatives from the employees are important in order to contribute to a higher educational climate within the organization and further development of the organization (Bakka et al., 2001).

A challenge that organizations face is coping with social responsibility and environmental sustainability. In order to handle these challenges, Lewin’s planned and ethical approach to change can be applied (Burnes, 2011). Lewin’s model includes three-stages; unfreezing, moving and refreezing, see table 1 (Carnall, 2007). All three steps in the model are necessary to perform a planned change (Burnes, 2011). Unfreezing is the stage where identification of what needs to be changed is recognized and where motivation and preparation for the change is planned (Burke, 2008). It is important to demonstrate the need for change, with the purpose to involve the employees and reduce the resistance (Burke, 2008). Moving is the stage where new ideas are tested and developed, the employees need to think outside the old frames and act differently (Burke, 2008). Refreezing is the final stage where new actions, skills and methods of working are established and the change is completed (Carnall, 2007) and the employees feel at ease and have accepted the change (Burke, 2008). Change can be seen as a sequential process, consisting of the following steps; “analysis and diagnosing, planning, implementation, and evaluation” (Alvesson & Sveningsson, 2008, p. 22). One of the most well-known models for successful transformations is Kotter’s model of change. It is a linear approach which identifies eight steps for performing a large organizational change and the process becomes successful only if the sequence is followed (Kotter, 1996). The two models, Lewin’s three-stage model and Kotter’s model of change are combined and presented in table 1 below.



**Table 1.** A combined table of Kotter’s model of change, the eight-stage process, adapted from Kotter (1996, p.21) and Lewin’s three-stage model adapted from Hoffman (2000, p. 168).

Lewin’s three-stage model	Kotter’s eight-stage process	Definition of Kotter’s stages
Unfreezing	1. Establishing a sense of urgency	The first step is to examine the market and investigate the reality. This by discussing and identifying crises and opportunities.
	2. Creating the guiding coalition	Creating a focus group, with the aim of leading the change and having a large influence. The group needs to work well together.
	3. Developing a vision and strategy	Create a vision and develop strategies in order to perform the change.
Moving	4. Communicating the change vision	Use all channels possible to communicate the new vision and strategies.
	5. Empowering broad-based action	Remove obstacles and change systems to improve the change process for the employees. Encourage them to have a positive view of the new ideas.
	6. Generating short-term wins	Plan for noticeable improvements and wins. Recognize and compensate employees that contribute to the change.
	7. Consolidating gains and producing more change	Develop and reinvent all parts of the system. Create new energy by promoting and educating the employees. Also improve the change process.
Refreezing	8. Anchoring new approaches in the culture	Develop the performance, leadership and efficiency of management. Connect new actions with organizational success.

The employees’ reactions to change are important for the organization since the employees are a part of the change process (Burke, 2008). Therefore, the organization should create necessary support for change and involve the employees in the process, in order to create commitment towards the change (Spector, 2010). Organizational change requires changes in the elementary strategy with a clear vision and mission statement. In order to facilitate the change, the emotional component of organizational change, the employees, must be prioritized (Burke, 2008).

Effective communication is a key factor in the construction industry for individuals, projects and the whole organization (Dainty et al., 2006). The performance is affected by how the communication is handled and defined (Gluch & Räisänen, 2009). In order to change the organizational structure and adjust the employees and the organization to the new routines, talk and action need to work together (Gluch & Räisänen, 2009). Communication is a fundamental part of the organizational work, where a communication model consists of three elements; transmitter, message and receiver (Bakka et al., 2001). During a change process it is extremely important that the transmitter and the receiver communicate with a clear message (Carnall, 2007). The communication in the construction industry is comprehensive and complex and is spread between different levels in the organization (Dainty et al., 2006). Therefore,

communication often involves more than one transmitter and one receiver, which requires a larger degree of responsiveness for the people involved. The construction projects are constantly making decisions that affect the environment, thereby precise and timely information can be seen as a critical factor in the communication process (Gluch et al., 2006).

“The phenomenon of resistance to change is not necessarily that of resisting the change per se but is more accurately a resistance to losing something of value for the person” (Burke, 2008, p.91). Therefore, it is common for employees to feel resistance against organizational change, when moving into the unknown. Moreover, organizational change often meets resistance. The main reasons why employees resist change initiatives are that the working environment will change and create uncertainties and ambiguities among the employees (Dawson, 2010). Common factors affecting resistance are; disruption of social arrangements, substantive changes in the job, lack of communication, lack of implementation of the new change, etc. (Dawson, 2010). According to Burke (2008), resistance is a natural behavior and can be seen as a sign of employee caring, when the employee’s environment shifts from a known situation to an unknown. Furthermore, it is important to not underestimate resistance, as it only takes one person to resist the change process and spread the resistance further in the organization (Potts & LaMarch, 2004).

## **Standards**

People and organizations around the world follow standards and Brunsson et al. (2000) state that standards generate a scheme for the users. Standards are regulated processes and can be seen as instruments of control, which contribute to coordination and collaboration, which creates similarities and patterns that bring people together. A classic standard consists of statements regarding the desirable qualities of a product, an activity or a document, where the goal is to reach consistency and regulate the design of the process. Furthermore, consistency can be achieved in two ways; by changing the practice to fit the standard or by changing the presentation of practice in accordance with the standard. To adopt a standard, a translation is needed. The process must move from “talk to action”. The requirements in the standard must be translated in order to function in the organization and from “general to specific”, where general requirements are interpreted into the organizations’ requirements. (Brunsson et al., 2000).

There are specific standards regulating the environmental issues as well as the construction industry, such as ISO standards and environmental assessments tools (Haapio & Viitaniemi, 2008). Several environmental standards are voluntary, but despite this, there is a growing trend for organizations to adopt standards (Wirl & Noll, 2007). Reasons for adopting a standard are; reputation, effective approach of transmitting information, simplicity, and coordination of work and functions (Wirl & Noll, 2007; Brunsson et al., 2000). However, there are also disadvantages, such as inhibited innovation, changed work procedures and often increased administration.

## Methodology

This paper is based on a case study, with the objective to provide an overview and create an understanding about NCC's environmental effort in general, and of the ECS BREEAM in particular. The case study approach offers an opportunity to investigate the company's organization and the different views, partly of top management and partly of the construction projects. The paper draws on qualitative studies (Eriksson & Kovalainen, 2011), comprising of on-site observations of three construction projects, text analyses and semi-structured interviews. Qualitative studies were used to seek a deeper meaning and understanding (Stake & Usinger, 2010), with interviews and observations as the main data collection methods (Eriksson & Wiedersheim-Paul, 2011).

The paper is based on both primary and secondary data (Hartman, 2004). The primary data is new information gathered during the interviews, while secondary data is existing material that can be further investigated, in this case, books, reports and webpages. In order to find relevant sources of information for the theoretical framework, a systematic literature review (SLR) was performed. SLR is a review that seeks to systematically identify, track down, and appraise literature on a topic (Okoli & Schabram, 2010). During the literature collection several sources were used. The first phase was to search for information in different data bases. A general search was performed in order to collect books, journals and papers within the research area. The following keywords and phrases were used; "BREEAM", "environmental classification", "environmental performance", "green building", "green construction", "greening of industry", "organizational change", "organizational structure", "sustainable construction" and other similar words and phrases within the research area. In addition, NCC's database and the internet have also been used.

To perform this case study of the ECS BREEAM, collaboration with NCC Construction Sverige, henceforth called NCC Construction and NCC Property Development, henceforth called NCC PD, was required. This was fulfilled through visits and interviews with three professional groups; BREEAM coordinators, BREEAM experts and top managers. The people interviewed at the projects were chosen because of their position as BREEAM coordinators. In addition, the projects' BREEAM experts were interviewed due to their specific knowledge and their integration in the projects. The top managers were selected by their involvement in the decision process of environmental issues, in NCC AB, NCC Construction and NCC PD. The top managers have positions in environmental management or have been driven and committed to the BREEAM process. The three construction projects were carefully selected using the following criteria; classification according to BREEAM, office and/or retail buildings, located in different regions in Sweden, and being in different stages of the BREEAM construction process. By studying the criteria, a general view of the implementation process can be achieved. Field visits on BREEAM projects and meetings concerning the work with BREEAM have also been conducted. This can be seen as direct observations that have given a broader perspective and deeper understanding of the organization (Yin, 2009).

In order to collect as much information as possible from the interviews, semi-structured interviews were used, which refer to the context where the interviewer has a series of questions connected to the subject (Bryman & Bell, 2011). The questions can vary depending on the interviewee and the response to the questions. Semi-structured interviews give the interviewees the opportunity to talk more freely within the area of interest. Before the interviews, questions were prepared and gathered in an interview guide, with a list of memory prompts for questions to be covered during the interviews and questions for an unstructured interview (Bryman and Bell, 2011). Depending on the interviewee, the questions were structured and varied, based on their knowledge and position within the organization. However, the guide was divided into five main categories; the environmental focus, the implementation process of BREEAM, the process of BREEAM in a construction project, costs connected to BREEAM and the future of BREEAM in NCC. This structure is repeated in the findings.

Interviews were made with three persons involved in top management, and seven persons involved in the BREEAM projects and the BREEAM process. Additionally, one e-mail interview was conducted with a former top manager, to get information about previous environmental work. The interviews were conducted in Swedish, because of the preference of the interviewees and to ease the process of communication by speaking their native language (Bryman & Bell, 2011). Since the interviews were conducted in Swedish, they were first written down in Swedish and then documented in English in the section called “findings”. The projects are named as project 1, 2 and 3 in order to create anonymity. The numbers are randomly chosen and are not connected to the order of when the interviews were conducted or to how far the projects have come in the BREEAM process. The interviewees at the projects are also anonymous and presented from the view of their position; BREEAM coordinators and BREEAM experts. Additionally, the interviews with the top managers are also presented by the view of their position. This gives the reader the possibility to interpret their view on similar projects, while citations and comments cannot be linked to a specific person. All interviews were recorded in order to interpret the material in a proper way and to increase the credibility and simplicity (Bryman & Bell, 2011). The lengths of the interviews were between 40 – 85 minutes.

The authors have adequate knowledge of the construction industry from earlier experiences and have gained access to the company’s data base as well as contact with relevant employees. One of the authors is currently employed in the company and has previous knowledge regarding BREEAM work in construction projects. This generates benefits, since it is easier to gain access and receive information. However, it can be seen as a risk, e.g. in the form of a biased view. Furthermore, the paper is based on different sources with high academic standards, such as academic papers, theory books and method books, which contribute to a high validity. The focus is on one company, NCC, which can be seen as a limitation. However, different perspectives within the company, projects and top management, are presented. The reliability has also been considered in the paper by the authors being well prepared, having good access to information and knowledge regarding the construction industry.

## Setting

NCC AB is one of the leading construction and property development companies in Sweden (NCC [1], 2012), where a trio of companies; Peab, Skanska and NCC, are the dominant companies in the market (Sveriges byggindustrier [1], 2012). The construction industry is an exposed industry since they are a part of the urban development, where development such as housing, office and retail complexes, roads and bridges are included. The construction industry consists of construction companies, architectural companies, technical consultancy companies and installation companies which engage approximately 300,000 persons and in the last couple of years the industry has turned over 400 billion SEK per year (Sveriges byggindustrier [2], 2012).

In Sweden, NCC AB has the following four business areas; NCC Construction Sverige (NCC Construction), NCC Property Development (NCC PD), NCC Roads and NCC Housing (NCC [2], 2012). NCC Construction is the largest business segment, which constructs industrial, office and residential facilities, as well as other buildings and infrastructure projects (NCC [3], 2011). NCC Teknik is a division within NCC Construction, with experts in technical and design issues (NCC [4], 2011). NCC PD operates in the area of commercial properties with property development and selling (NCC [5], 2011).

NCC has a strong commitment to the environment, with clear environmental strategies and policies. In 2009, NCC PD made the decision that all NCC PD's own developed projects should be classified according to BREEAM. Furthermore, in 2011, an environmental council was created in NCC where responsible people from the business areas were attending. The environmental council developed the sustainability strategy which all business areas work towards, where ECSs are one of the focus areas. NCC was one of the first companies in Sweden that was engaged in adopting BREEAM to the Swedish construction market and process as well as the one to support the BREEAM assessor's education. Advantages highlighted with the BREEAM certification system are that the system is based on the European context and standards. Today, NCC PD has approximately ten projects which will be classified in accordance to BREEAM (NCC [6], 2012). The projects can be classified on a scale consisting of five levels; "pass" ( $\geq 30\%$ ), "good" ( $\geq 45\%$ ), "very good" ( $\geq 55\%$ ), "excellent" ( $\geq 70\%$ ) and "outstanding" ( $\geq 85\%$ ), which all have a minimum percent level of points to achieve. The lowest level for NCC to achieve is "very good" ( $\geq 55\%$ ) (NCC [6], 2012).

The motive for BREEAM is to reduce the building's impact on the environment at an early stage and then analyze the impact throughout the entire construction process (BRE Global, 2009). Buildings classified according to BREEAM receive a declaration and classification of their environmental qualities. BREEAM focuses on ten categories; management, health and wellbeing, energy, transport, water, materials, waste, land use and ecology, pollution and innovation (BRE Global, 2009), and each category has several subcategories, see table 2. The different categories and their subcategories are weighted and evaluated differently depending on what part of the world the project is located in, e.g. the water category has a low value in Europe, while it has a higher value in other parts of the world (BRE Global, 2009). The

weighting of the categories is rather equally distributed in Europe. The first nine categories add up to 100%, while the last category (innovation) generates a 10% bonus. All requirements are gathered in a manual, referred to as the BREEAM manual.

**Table 2.** The BREEAM categories; an explanation of the main issues and weighting of each category (BRE Global, 2009).

<b>BREEAM categories</b>	<b>Main issues of each category</b>	<b>Weighting of categories</b>
Management	Commissioning, construction site impact, building user guide	12%
Health and Wellbeing	Daylight, occupant thermal comfort, acoustics, indoor air and water quality, lighting	15%
Energy	CO <sub>2</sub> -emissions, low or zero carbon technologies, energy sub metering, energy efficient building systems	19%
Transport	Public transport network connectivity, pedestrian and cyclist facilities, access to amenities, travel plans and information	8%
Water	Water consumption, leak detection, water re-use and recycling	6%
Waste	Construction waste, recycled aggregates, recycling facilities	7.50%
Pollution	Refrigerant use and leakage, flood risk, NO <sub>x</sub> emissions, watercourse pollution, external light and noise pollution	10%
Land Use and Ecology	Site selection, protection of ecological features, mitigation/enhancement of ecological value	10%
Materials	Embodied life cycle impact of materials, materials re-use, responsible sourcing, robustness	12.50%
Innovation	Exemplary performance levels, use of BREEAM Accredited Professionals	10%

The ECS BREEAM is administered by the Building Research Establishment (BRE) in the UK (SGBC, 2011). BRE is an independent third party inspector and examiner of all BREEAM certifications and they also work with counseling, research and education (BRE Global, 2009). BREEAM consists of two stages; Design Stage (DS) and Post-Construction Stage (PCS) where DS treats the ongoing construction phase, while PCS focuses on the final building (BRE Global, 2009). Reports are written for the two stages; DS and PCS, and then reviewed and examined by BRE.

In the BREEAM process different positions are included. In NCC the role of the BREEAM assessor is to have a supervisory and evaluating role. The BREEAM experts support and advise the BREEAM projects and can also be assessors, whereas the BREEAM coordinators are the ones collecting and preparing the evidence for the BREEAM assessor. For the interviewed construction projects, an overview is compiled in table 3, where general information about the projects is presented as well as the positions of the BREEAM assessors and the BREEAM coordinators.

**Table 3.** An overview of the construction projects.

	<b>Project 1</b>	<b>Project 2</b>	<b>Project 3</b>
Building area	30 600 m <sup>2</sup>	11 200 m <sup>2</sup>	14 600 m <sup>2</sup>
Contract sum	570 million SEK	88 million SEK	276 million SEK
Construction start	October 2011	August 2011	December 2010
Construction end	Autumn 2013	Autumn 2012	Spring 2013
Type of building	Office & Retail	Retail	Office & Retail
BREEAM classification level	Excellent	Very good	Very good
BREEAM assessor	NCC Teknik	NCC Teknik	External
BREEAM coordinator	Contract engineer	Contract engineer	Contract engineer

## Findings

### Environmental focus

According to a top manager at NCC AB, NCC's aim is to coordinate environmental efforts in the company and to develop the business units to work in a similar way with environmental issues. Furthermore, the manager formed a general sustainability strategy for NCC which involves four priority areas; climate and energy, chemicals and durable materials, environmental classification systems of buildings and constructions, and waste and recycling. The manager has set the target year of the strategy to 2020 since the conversion rate in the environmental aspect is rather slow. Annual action programs involving the respective priority area help to approach the target.

“All business areas worked very differently, therefore coordination of the environmental work was essential. A unified NCC can achieve more.” - Top manager NCC AB

The business areas are now unified towards the sustainable strategy where each area has environmental managers attending the environmental council which was established by a top manager at NCC AB. The environmental council was involved in the development of the sustainability strategy and is now working to encourage the environmental issues in the company. Several top managers believe that the link between the environment and business is of the greatest importance and state that it is what drives environmental issues forward within the company. They also claim that the construction industry often is referred to as conservative, but the industry has evolved to be more proactive on environmental issues and they emphasize that environmental issues have developed incredibly in the last three to four years.

“The investors and the tenants started to demand sustainable construction which contributed to a further driving force and responsibility for the company. It was an important factor for the investors and the entrepreneurs.” - Top manager NCC PD

NCC PD is the business area in NCC which acts on the most trend sensitive market, whereof there is early awareness of the demands of ECS. The top manager at NCC PD realized early on, the importance of being a leading company within ECSs. During the

interviews it was stated that NCC PD built the first office building and the first retail building classified according to the ECS Green Building in Sweden. However, the focus of the ECS Green Building is mainly energy consumption. Therefore, NCC PD started to investigate more comprehensive ECSs. Since NCC acts on the European market, the ECS BREEAM was chosen since it is extensive and is adapted to the European legislations. ECS is considered by the interviewees as a clear label showing the customers the holistic approach of the system. A top manager at NCC AB believes that the reasons why ECSs have become prosperous are because more people are aware of the environmental issues and also because of the large signal value of the systems. Since ECSs are examined by a third party, it gives an attractive value of being classified, which may generate competitive advantages. A top manager states that it is important to be able to deliver what clients demand, which includes both energy efficiency and environmental performance. The interviewed top managers believe that the ECSs are tools to become more sustainable, e.g. they claim that BREEAM highlights the social dimensions as well as life cycle analysis perspectives. Furthermore, they agree that it is important to be able to supply various ECSs to meet the customers' different needs.

“Today, few buildings are classified according to BREEAM, which at the moment, results in a low environmental profit. (...) However, BREEAM can hopefully merge the environment with the market economy.” - BREEAM expert

A top manager at NCC Construction states that the goal with BREEAM is to integrate it into the construction process. If it will remain as an additional process, it will not survive in the future. The BREEAM experts state that BREEAM provides opportunities at different levels. It is partly an environmental system and partly a quality system. It gives the company a “quality label” which the company can use in their marketing and communication to the market. A top manager at NCC AB mentions that the prejudice surrounding BREEAM is that it is cumbersome to work with and involves a number of employees. Furthermore, the manager's goal is to make the BREEAM process easier as well as inexpensive and fast. Today, there are only a few projects in NCC classified in accordance with BREEAM. These projects pull a heavy load where much time is spent on the implementation of the ECS. Therefore, the BREEAM experts are working with producing documents in order to ease and even standardize the BREEAM work for the projects. The organizations need to spread out the knowledge that already exists in the projects and learn from each other.

### **The implementation process of BREEAM**

A top manager at NCC PD believes that an ECS in the future will be a so called hygiene factor; an essential part in the construction process. The decision to implement the ECS BREEAM was taken by NCC PD.

“We pushed this idea, we recognized the benefit to our clients, both tenants and investors, but it was very hard to get all business areas along. (...) We have experienced how difficult it was to get the whole organization to strive for a common goal.” - Top manager NCC PD



A top manager at NCC PD states that the BREEAM implementation process was much worse than imagined. The attitude from NCC PD after the decision to classify according to BREEAM was, according to the top manager, to “just do it”. However, BREEAM is a complex system and involves both NCC PD and NCC Construction. The system is placed somewhere in between the two business areas, referred to as a grey zone by the top manager in NCC PD. The top manager further states that at this point, in 2009, the sustainability strategy was not yet designed and NCC AB did not even have an environmental manager; no one who pushed the general environmental work forward in the organization. According to a top manager at NCC AB, the sustainability strategy created in 2011 contributed with a general vision and a mission statement for all business areas in NCC.

A top manager at NCC PD describes the startup process where the property development division and the construction division collaborated and educated two employees to become BREEAM assessors. The assessors were very coveted since the knowledge did not exist earlier. However, this resulted in an overload of work and they chose to leave their positions. Since then, there has been an internal knowledge gap where the reliance has been mostly on external consultants. Thereafter, the education and support of BREEAM have gradually developed. A top manager at NCC Construction states that the original plan was to educate all employees within the company’s organization to BREEAM, but the plan has changed and the education is now project specific, where those who are involved in a BREEAM project get support. NCC Teknik today has the in-house competence but the projects managing ECSs also need competence. Therefore, the education regarding ECSs in the projects is funded centrally by NCC to avoid doubts or discussions about the funding between NCC PD and NCC Construction. Furthermore, the top manager states that an idea is to work in partnering projects when working with BREEAM.

Several top managers claim that it has been hard to find specialists and people with a background in ECSs. NCC Teknik is the internal consultant and they increase their resources and competencies according to the organization’s demands. Furthermore, the top managers state that due to the growing demands over the last few years, NCC Teknik has gained enough knowledge to support the projects today. Moreover, a top manager at NCC Construction prefers that even if the contractor insists on using an external BREEAM assessor, NCC Teknik should also be engaged in order to support the process, but mainly to gain and exchange knowledge. Furthermore, the top manager stresses that it is important to have a common view of BREEAM in the projects, so as to not let the classification get out of hand, e.g. through lack of information or mistakes. Therefore, it is seen as essential to spread the experiences between the projects.

### **The process of BREEAM in a construction project**

In the three studied construction projects, with requirements to classify according to BREEAM, the BREEAM coordinators describe the startup process rather similarly. The BREEAM coordinators at two of the projects, projects 1 and 3, describe that the pre-assessment process started almost six months before the start of construction, where they investigated costs and which category they should take in order to reach their BREEAM classification level. The two projects also allocated time during the six months to study the BREEAM manual to understand what the ECS included and how

to interpret the standards. Project 2 started the BREEAM work at the same time as the first design meeting.

The view of BREEAM and the BREEAM requirements vary from positive to negative among the BREEAM coordinators. They can see the benefits of the ECS, e.g. sustainability and a more environmentally friendly approach, a cleaner and more organized construction site with information boards, parking areas, and environmentally friendly materials. However, it also contributes to an extensive amount of work. A common denominator in all three projects is the lack of previous experience of ECSs, which results in a longer startup time. The BREEAM coordinator at project 1 states that the BREEAM process is not fully functional, largely due to the support and routines connected to the classification process. Moreover, a top manager at NCC Construction mentions that the company is in a learning process, but still belongs to the companies in the industry with the most knowledge regarding BREEAM. Further on, the manager states that creating simplicity and understanding for BREEAM in the project organization are movements in the right direction as well as standardizing technical solutions and products for BREEAM.

All interviewees agree that it is hard to interpret the BREEAM manual. One of the BREEAM experts states that construction companies are brave, since they change their work process according to BREEAM, which in Sweden, is still a rather unexplored ECS. Furthermore, the BREEAM manual is extremely specific and is divided into categories at a very detailed level. Moreover, BREEAM contributes to an increased work load, since the BREEAM work and the construction process are not integrated in a mutual process. The BREEAM coordinators state that the administrative work increases as a result of BREEAM. The extra work load at the project contributes to stress, frustration and a need for extra support. Therefore, extra resources are prioritized at the BREEAM projects. In order to make the BREEAM work easier, the BREEAM experts try to identify “enthusiasts” and connect them to the BREEAM projects. A top manager at NCC PD claims that the implementation process has taken a much longer time than expected, partly because of lacking adaption to Swedish standards and partly because of internal friction. Furthermore, several top managers emphasize that the construction industry is generally poor in documenting for the future. Since the projects work separately, the knowledge must be transmitted to the next project to reduce the same work being performed twice.

For all BREEAM coordinators it is their first BREEAM project, therefore the experience regarding the ECS is low. The projects gain support from BREEAM experts at NCC Teknik and from external consultants. However, there is difficulty in interpreting the material from BRE, and both the BREEAM experts and assessors from NCC Teknik and the external consultants cannot answer all the questions. All BREEAM coordinators agree that it is a problem and it takes time to solve ambiguities, e.g. if a question is sent to BRE in the UK it often takes more than two weeks to receive an answer, which delays the work. However, the BREEAM coordinators state that they do get support, but wish they could get more.

The BREEAM experts and BREEAM coordinators state that communication is extremely important between experts and coordinators as well as between experts in NCC and experts in consultancy firms. All interviewees stress the importance of

information and the spread of information between BREEAM projects. Today, exchange does not exist even if the BREEAM coordinators at projects 2 and 3 stress that they have limited feedback from other BREEAM projects. The BREEAM coordinators state that each project is isolated and the experiences stay within each project. Furthermore, they stress that there is no general standard regarding BREEAM documentation in NCC, which causes extra work and contributes to a more extensive work process for each project. BREEAM coordinators at project 1 suggest that a conference for people working with BREEAM at NCC would be a good start of a feedback process.

To further improve the communication, all BREEAM coordinators claim that it is important to inform the concerned party in the project about BREEAM since it is a new ECS for the company and concerns all people involved in the project. Today, BREEAM meetings are continuously held in all three projects, ranging from weekly to once a month. At the meetings, questions are raised and decisions on further work are made. However, all BREEAM coordinators feel that the meetings often become too long and do not concern everyone attending. BREEAM coordinators at two projects, projects 2 and 3, suggest general meetings where everyone in the project can attend, and “deep meetings” only for the ones who are most involved. From the interviews with the BREEAM coordinators, all recommend having meetings at an early stage where the design team can adjust the building to the BREEAM requirements.

The BREEAM experts are trying to simplify and compile parts of the BREEAM manual, in order to rationalize the work for the ones involved. Specific parts of the manual are interpreted in Swedish in order to ease the burden for the people involved. The BREEAM experts have also investigated how to simplify the BREEAM process at NCC, thus, different tracks have been developed. The BREEAM experts’ shared vision for the future is that BREEAM coordinators and experts will work together, in order to further develop and form the BREEAM process. The developing work and practical work should go together, which will ease the BREEAM work for future BREEAM projects. The BREEAM experts claim that when knowledge is more spread out and when the projects understand the benefits of BREEAM, as well as the magnitude and the meaning of it, the work will run more smoothly. They also believe that when the projects have adopted the work of BREEAM, it will be integrated within the construction process and will not contribute to extra work. All BREEAM coordinators feel that when the second project will start or when a project includes employees that have experience of BREEAM, it will be much easier. This view is also shared by the top managers and the BREEAM experts.

### **Costs connected to BREEAM**

During the interviews it is shown that the exact cost for a BREEAM project is hard to estimate, however, the initial costs are much higher for a BREEAM project than for a non-classified project. The BREEAM coordinators, one BREEAM expert and two top managers believe that the additional cost due to BREEAM is around 1.5-3 million SEK. The cost depends on the type of project, location and BREEAM classification level. According to the BREEAM coordinators and one BREEAM expert, the costs for a BREEAM project can be divided into; registration, certification, questions, translation and administrative costs, which can all be measured. All BREEAM coordinators claim the administrative cost as the largest one, where large sums are

connected to coordination of work and collection of BREEAM evidence. Costs for meetings and the BREEAM assessor are also included in the administrative costs. For all projects, the registration fee is approximately 100,000 SEK (if the building includes two types of buildings, e.g. both retail and office, two classifications must be done, i.e. 100,000 SEK x 2 = 200,000 SEK) and the translation cost from Swedish to English is around 16,000 SEK.

The BREEAM coordinators estimate the work load for BREEAM at a project to be one full-time employment, but since the work load varies depending on the different stages in the BREEAM process it can be combined with other tasks. BREEAM coordinators at projects 1 and 3 suggest that the work could be divided between two persons in order to ease the burden and the coordinator at project 3 also adds that it is good to have some previous experience of the construction industry and production before starting with BREEAM. All BREEAM coordinators agree that increased knowledge of BREEAM reduces the costs connected to the system.

“BREEAM will contribute to a quality assurance to our buildings that we have not had before, and will also reduce costs due to errors.”

- Top manager NCC Construction

A top manager at NCC Construction states that the costs of a BREEAM project will reduce since the control of the construction process is more regulated and that the material choices are supervised and reported. The manager further claims that the increased control will contribute to fewer changes in late stages of the construction process, which reduce the costs. Moreover, the manager states that there is a presumption that projects classified to ECS will be more costly in terms of investment, but in return the customer receives an alternate product with a higher quality. Therefore, the manager raises the question if it really can be seen as an additional cost. From a larger perspective, the manager anticipates that there will be cost savings connected to the ECSs since the process becomes more visible and integrated in the construction process.

Several top managers agree with the idea of standardizing the BREEAM concept in all NCC projects in order to reduce the discussions of additional costs due to sustainable construction. A top manager at NCC PD states that a pure monetary value will be generated by classify buildings according to BREEAM and if two equivalent products are presented on the market, the investor will always choose the one with the highest environmental classification level since it increase the value of the building. Furthermore, the top manager claims that the cost of BREEAM is connected to the classification level and it is important to understand when the relationship between the value of the classification level and the costs subsides. Investigations of the different classification levels and what costs are connected to each level must be made in order to know which level to strive for in the future. Furthermore, the top manager states that if it turns out that the investment in BREEAM will not pay back, it is still the right direction to strive for and will be in the future.

However, the standardize concept is questioned by the BREEAM coordinators at project 1. They question the benefits of BREEAM, since each project chooses which BREEAM categories they want to achieve. Categories can be chosen because they are

easy to achieve or have a low cost connected, and not because of the environmental benefits.

### **The future of BREEAM in NCC**

“The more environmental efforts are driven to become a part of business, the clearer it becomes that environmental issues are integrated into the organization.” - Top manager NCC Construction

Several top managers agree that the environmental aspects of business have become more important and that the process must be more integrated in the organization where employees are working together towards a common goal. The environmental work connected to the sustainability strategy should be further spread in the organization in order to increase cooperation between the business areas in NCC. A top manager at NCC Construction believes that the environmental organization will grow at staff level and that the project organization will have more environmental expertise in the future.

All BREEAM coordinators stress that the main focus at the moment should be to learn the ECSs better. Moreover, the knowledge needs to “touch ground” first (be established in the organization) and more people in and outside of NCC need to be educated, especially the subcontractors. A top manager at NCC PD claims that it is important that the organization sees the value in appointing people with earlier BREEAM experience in order to optimize the process. Furthermore, a top manager at NCC Construction elaborates that NCC will continue to develop BREEAM experts and assessors in-house and that it is important to have one person connected and updated with the BREEAM work throughout an entire project.

“We need to plan and document for the future and use platforms to gradually reduce costs. Today, the tradition in the construction industry of documenting is poor.” - Top manager NCC AB

A top manager at NCC Construction accentuates that the market will increase the demand for verification of the quality and the sustainability documentation of the construction process. Furthermore, a top manager at NCC Construction talks about a strategy of becoming more proactive and improving the marketing of sustainability issues. It is important to turn the negative trend of ECSs as costly, retro-perspective and complicated towards a positive view. However, several top managers are certain that ECSs are future strategies for NCC which will become a hygiene factor, especially for commercial property investors.

## **Discussion**

### **Sustainability in NCC**

The demand for sustainability has grown on the market and in order to remain a strong competitor NCC needed to change due to the changing business climate (Burnes, 2011; Gluch et al., 2009). Thus, NCC’s large environmental effort is a step towards a more sustainable future both for the company and the construction industry. The result

from the interviews with the top managers shows that NCC's proactive environmental work has resulted in a general sustainability strategy for all business areas where annual action programs have been established. This is in line with Gluch et al. (2011) who claim that the construction industry works to stimulate innovations and operations of sustainability more intensively. By creating the environmental council in NCC, all business areas have been stimulated to work with the sustainability issues, which has contributed to a coordination of the environmental work and encouraged the environmental issues in the company. The sustainability strategy, the annual action programs and the environmental council demonstrate that NCC has an intention to change into a more environmentally friendly approach.

The top managers believe that the link between the environment and business is of the greatest importance and that is what drives the environmental issues. Furthermore, the managers agree that they have experienced that demand from society; investors and buyers have increased which is in line with the drivers that Hoffman (2000) and Stenberg and Räsänen (2006) mention. Society's demand for companies to adopt environmental and sustainable initiatives has grown and become a large part of business. The demand from society is mostly registered by NCC PD since they act on a more trend sensitive market with a close collaboration with investors and tenants. According to Hart and Milstein (2003) and Dunphy et al. (2007) it is shown that sustainable development contributes to social and ethical benefits for the organization, which are advantages that all interviewees, top managers, BREEAM experts and BREEAM coordinators, agree on. Furthermore, Hart and Milstein (2003) also mention economic benefits due to sustainable development. However, in general, the top managers claim that it will be easier to sell a property to an investor in the future if it is classified according to an ECS.

The early involvement in ECS, where NCC PD took a large responsibility in the adoption of the ECS in Sweden, shows a commitment towards a more sustainable future as well as an awareness of what the investors and tenants demand. It also creates legitimacy which contributes to credibility from society. NCC was one of the first companies adopting the ECS Green Building in Sweden, but started shortly thereafter to work towards the ECS BREEAM, which is a more comprehensive system. The motive for adopting BREEAM increased when the sustainability strategy was compiled in 2011 since the strategy includes; climate and energy, chemicals and durable material, waste and recycling and environmental classifications, which all are included in BREEAM. The sustainability strategy is also an indication that the business areas in NCC have started to work towards a common strategy, and the goal for all business areas to adopt ECSs.

The top managers see BREEAM as a large signal value since it is a well-known ECS. NCC hereby demonstrates awareness towards environmentally and ecologically friendly solutions, as Kibert (2008) mentions, when BREEAM is on its way to becoming an integrated part of NCC's construction process which Toben (2011) refers to as a modified process. According to Gluch (2005), it is important to show an increased awareness since the construction industry, which for a long period of time, had been seen as an industry which highly contributed to pollution. Due to the ECS BREEAM, NCC gets a stronger market value and a competitive advantage, as stated by Ball (2002). Since BREEAM is a third party reviewed system, it even increases the

value of the system. However, it is important to remember that the third party (BRE) is an organization who makes a profit when companies classify buildings according to their system (BREEAM). Therefore it is important for NCC to audit the system and not be blinded by the third party's influences. A vision in NCC is to always have in-house assessors connected to the BREEAM projects which contribute to an internal expert knowledge of the ECS and a way of auditing the system.

As stated by both a top manager and Skopek (1999), the environmental change is a slow process. Even though the construction companies started to work with ECSs already in the 1990's, it is during the recent years that NCC really has focused and prioritized ECSs. The sustainability strategy's target year is 2020 which indicates that the organization is aware that the environmental changes take time. The fact that the BREEAM implementation started in 2009 and that the company today does not have a building that is classified shows that NCC allows the process to take time. Today, the environmental profit for NCC is low, however, the environmental awareness at the BREEAM projects has increased, which can be seen as a step in the right direction. In general, organizational changes take time, since the organization is adopting new systems and new processes. However, it can be questioned if the implementation process of BREEAM at the projects started too early after the decision was made, due to the knowledge gap and the long startup time.

### **Organizational change**

When NCC PD understood that the market started to request ECSs they addressed their customers in order to determine the interest for ECSs. There was a demand and therefore NCC started to change in order to keep a strong position on a rapidly changing market (Burke, 2008; Burnes, 2011). The start of the BREEAM implementation process at NCC was delayed since BREEAM required new knowledge and education, which in Sweden was limited to a few people. The startup process was affected by lack of education within the area which resulted in a knowledge gap. However, today NCC has regained the focus and has developed a more viable plan, e.g. by employing BREEAM experts who support the projects and plan for how to execute the upcoming work. This process is in line with Moran and Brightman (2001), Dawson (2010) and Potts and LaMarch (2004) who claim that it is important to work towards a goal and adjust the organization to the demanded change.

Change management is about renewing and adapting the organization to the ever changing surrounding environment (Moran & Brightman, 2001), which is what NCC did and are still doing. It was NCC PD that took the initiative towards a more environmentally friendly effort, where different ECSs were investigated in order to recognize which system would be the most important one for them. Today, this decision is in line with NCC's sustainability strategy, where one of four priority areas is to work with ECSs for buildings and facilities. Even though the decision was made by NCC PD, it is a strategic decision that affects NCC's whole organization in a positive way. However, implementing an ECS is not required by Swedish law, but the interviewed top managers at NCC PD saw it as a part of the future, with the implementation of BREEAM. The BREEAM process can be seen as complex and challenging and involves different levels in the organization which is in line with literature from Whelan-Berry and Somerville (2010). In NCC, the decision was a top down process, where top managers took the decision and then conveyed the decision

further down in the organization. The largest challenges for the managers are to get the whole organization to work together and especially to have an open and strong collaboration between NCC PD and NCC Construction.

Lewin's three stage model that is connected to Kotter's model of change in the theory section (Carnall, 2007; Kotter, 1996) can be applied to the organizational change in NCC connected to the BREEAM implementation. The "unfreezing" stage in Lewin's model includes the first three stages in Kotter's model. Based on the interviews, NCC was, for a long period of time, in the stage called unfreezing. Generally, the unfreezing period was between the years 2009 to 2011. During this time the first three stages in Kotter's model were processed. This can be seen by the preliminary investigation of different available ECSs on the market and the decision to implement BREEAM. The ECS was chosen due to the environmental comprehensiveness and of being a European adopted system since NCC mainly operates in Northern Europe. For NCC PD, BREEAM contributed with a value to their products, where the buildings became more attractive for investors and customers while the construction division at NCC met a larger challenge to adopt the construction process.

The disadvantage with the implementation of BREEAM was that NCC Construction was not equally involved in the process from the beginning. All interviewed BREEAM coordinators understand that the decision was made by NCC PD but perceive it as unclear to classify according to an ECS as a part of the sustainable strategy. Therefore, it was perceived as a requirement only set by NCC PD and not a requirement in line with the strategy for the whole company. Since it is unclear that the investment in ECS benefits the whole organization, NCC PD often is accused of the high demands that NCC Construction needs to fulfill. Due to this ambiguity, the requirements are often met with resistance. This is a sign of lack of communication, which, according to Dawson (2010), leads to resistance. Therefore, it is important for NCC to clarify that ECS is a strategic decision in the sustainability strategy that the whole organization (in this case NCC AB, NCC Construction and NCC PD) stands behind, even though it is NCC PD that has made the decision to work towards the ECS BREEAM. Furthermore, as stated by Potts and LaMarch (2004) it only takes one person to spread the resistance further, therefore it is important to reach and inform all employees at the projects and within the organization. NCC's mutual sustainability strategy brings the employees and the different business areas together within NCC and contributes to a more unified organization. A unified NCC where all business areas gain from the environmental effort of the ECS is important to reach in order to reduce the resistance.

At the moment, NCC's organization is in the stage that Lewin calls the "moving" stage, where things are changing, the employees are starting to accept the development and a change within the organization can be seen. From all the interviews, the attitudes towards BREEAM were generally positive. The main reason for this is that the system contributes to a holistic approach, where the focus is not only on a few environmental aspects. Instead, it could be seen as a life cycle approach of the construction process (EPA, 2010). The decision to work according to BREEAM was interpreted differently from NCC PD and NCC Construction. NCC PD saw the benefits of the ECS since it contributed to an added value to their products. At the same time, they did not realize the magnitude of the system and thought that they just needed to adopt it. However,



for NCC Construction it became more difficult, since they became the problem solver and the one who was supposed to deliver the new solution. Therefore, the BREEAM coordinators see BREEAM partially as a burden and a decision made by NCC PD, which contributes to a complex construction process and more work for NCC Construction. However, many issues in BREEAM are already integrated into the ongoing construction work, but issues that should be documented today are often neglected. Therefore, the BREEAM requirement is not a completely new process but rather a modified process which Toben (2011) also agrees with.

For NCC PD the investment in BREEAM was more positive than for NCC Construction, since it did not result in large changes in their work process. NCC has now started to change the processes and improve the BREEAM implementation for the projects. Examples of this are the two BREEAM experts who were interviewed. They now support the projects throughout the entire process. Another example is that the BREEAM process is more structured by involving the employees of the project at an early stage. After interviewing both BREEAM experts and BREEAM coordinators it can be seen that the projects often have problems with the same parts of the BREEAM process. Since the construction projects are spread out and often isolated, a clear communication path is hard to reach (Dainty et al., 2006). At the moment, BREEAM coordinators are isolated at their projects with no earlier experience. Precise and timely communication as mentioned by Gluch et al. (2006) is an important factor to minimize the work load and clarify ambiguities, which is a common demand from the BREEAM coordinators.

From the interviews, it can be understood that communication and cooperation between the BREEAM coordinators have been initiated to some extent. The suggestion to organize a conference for people involved in the BREEAM work can be one way to increase the communication between the different projects. Bakka et al. (2001) and Spector (2010) claim that this type of initiative from the employees further develop the organization and therefore it is important to create necessary support for the employees. Furthermore, it is also important to communicate the BREEAM requirements so that the people involved in the project understand their tasks. Two of the projects allocated almost six months each to learn BREEAM, but the most recently started project did not need any preparation time since the organization at this point processed enough knowledge to ease the startup process for the project. By improving communication, both internally in the projects and externally with other BREEAM coordinators, the BREEAM work will be more effective. This is in accordance with Gluch and Räsänen (2009) who claim that effective communication influences the performance. Therefore, exchange of knowledge, experience and information could ease the BREEAM work. This can be achieved by introducing universal company templates, checklists and standard documents as well as collecting the documents at a virtual BREEAM portal at NCC. On this portal, previously approved BREEAM documents should be gathered and a forum for questions and dialogues should be established.

In order to carry the BREEAM work forward, the employees need to be motivated. In NCC, this can be improved since the BREEAM coordinators often feel resistance from people at the project, which results in frustration and decreased motivation towards BREEAM. Furthermore, the BREEAM coordinators feel frustration and

stress since they experience a need for extra support and feedback which Dawson (2010) points out. It is important to be accommodating and to have a clear communication so that the BREEAM coordinators do not feel resistance. NCC is aware of the issue since the first BREEAM experts chose to leave their position. Education is a way to reduce resistance as well as knowledge gaps. Today BREEAM education is project specific. However, it may also be used as a way to give general information to all concerned parties of the organization regarding BREEAM. This is done because the implementation of BREEAM is a new system and an unknown environment for the employees, a change which not unusually is met with resistance according to Burke (2008). The vision to achieve a unified positive view of BREEAM in NCC could thereby be fulfilled.

NCC is in the latter part of Lewin's moving stage, since parts of the ECS are adopted by NCC in order to fit the construction process. To move to the final stage in Lewin's model, the "refreezing" stage, the vision is that the BREEAM process should be implemented in NCC's construction process. However, it is hard to integrate these two processes entirely, but the intention is to correlate business and the environment. When a number of BREEAM projects are classified it is important to evaluate the result. Alvesson and Sveningsson (2008) mention; costs, environmental benefit, work load and customer satisfaction, as valuation aspects. Then it is possible to see if the system is worth investing in. Therefore, the vision that all NCC PD's own developed projects should be classified according to BREEAM can be seen as a brave decision. The question can be raised if it would have been better to put effort in a few pilot projects instead before having it as requirement for all their own developed projects. This in order to be sure that the ECS BREEAM is the right system for NCC. However, the vision from NCC PD is that even if the system will not pay back in the future, they still believe that it is the right direction to go.

### **Standards**

After the decision to classify office, retail and industrial buildings according to BREEAM was made, the implementation of the system started. Even from the start, NCC PD thought that the process would take some time, since it was a new and extensive system. However, the process was more complex than expected, due to e.g. knowledge gaps and adoption of the BREEAM manual to Swedish standards. Furthermore, the complexity of the system must be taken into consideration where BREEAM adds additional work to a project, since the system is divided into ten categories which are further expanded into subcategories. This generates a rather complex system for the employees. During the interviews, remarks regarding difficulties in interpreting the system, as well as the complexity of it have arisen. The BREEAM experts understood, at an early stage, the complexity and the difficulty of the manual and have therefore made a guide in Swedish in order to increase the understanding of the original manual as well as to ease the work for the projects.

According to Brunsson et al. (2000), BREEAM can be seen as a standard since it regulates the environmental work in the construction process. Standards are a way for NCC to control and regulate the process in order to create similarities and patterns for the employees. NCC's vision to standardize the process is common for companies since standardization coordinates work and effects the transmitting of information, especially when it concerns large complex systems such as BREEAM (Brunsson et al.,

2000; Wirl & Noll, 2007). NCC PD has decided to classify all of their own developed projects to a minimum of “very good”, where 55% of the requirements must be fulfilled. Because the system is new, NCC strives for a higher percentage today, e.g. 65%, but as knowledge about the system grows, the company wants to narrow the process and reduce the costs. Therefore, NCC has started to look over the system and make it more suitable for the construction process. NCC creates a standardization of the system and focuses on specific categories and subcategories that are easier to reach and have a low cost, which, from a production and economic perspective, can be seen as positive. This is in line with a statement from a top manager who claims that the goal for NCC’s implementation of BREEAM is to make the process inexpensive and fast. Furthermore, the top manager claims that it is a myth that the environmental work is always a cost factor. Then, the question can be raised in what time frame the process should be inexpensive and fast. At the moment, environmental work adds additional work and thereby an additional cost. Even if it is possible to integrate the environmental work in the future, e.g. BREEAM, in the construction process, the fixed cost, such as the registration fees, will remain. Today, the BREEAM work requires one extra full-time employment at each project due to a large administrative work load. This post could in some way be removed if the ECS and the construction process would be fully integrated, however, it will take time. This view is shared with Robichaud and Anantatmula (2011), who believe that the cost will decline in a long term perspective, but that ECS still is associated with increased costs.

However, from an environmental perspective it is easy to lose the environmental focus when the BREEAM process is narrowed down. This since BREEAM categories can be chosen because of simplicity or low costs rather than the environmental benefits. The question is, how much does a “narrowed BREEAM process” contribute to sustainable development and the signal value that the company wants to communicate. This question was also raised during an interview with BREEAM coordinators. If the environmental and sustainable focus is reduced, then the initial purpose of the system will also be reduced. NCC might not gain as much of a competitive advantage, and if it is discovered that NCC attempts to be more sustainable than they really are, it would prove to be a drawback rather than a competitive advantage. On the other hand, the building does still fulfill the regulated demands of a BREEAM classification and is thereby more attractive on the market. If the company promotes itself as a sustainable company with ECSs, as NCC does, it could lead to decreased legitimacy when the company is not as sustainably proactive as promoted. When the BREEAM process is narrowed down to a standard, consistency is fulfilled by changing the presentation of the construction process in accordance with the ECS. However, Brunsson et al. (2000) describe the ideal way to achieve consistency from an environmental perspective is by actually changing the construction process to fit the ECS.

NCC’s BREEAM work provides opportunities since it is partly a quality system and partly an environmental system which indicates that the initiative is legitimized. A stronger quality label can be used for marketing and communicating to society. A standardized product can result in a lower cost for BREEAM and can thus attract more investors and tenants. Even if some of the environmental focus could be lost by standardizing BREEAM, NCC can in return get an overall increased sustainability and quality of the construction process. If the market starts to see BREEAM as a label for

quality they may be willing to pay more, resulting in a higher selling price for the building. Top managers state that the ECS, in NCC PD's case BREEAM, will be a hygiene factor in the future due to the increased demand from society. There is a view that the investors always will choose a BREEAM classified building ahead of a non-classified building. However, it is important to remember that not all investors are willing to pay or are committed to environmental work. Therefore there will probably remain a market for non-classified buildings.

In order to create a standardization for NCC's BREEAM projects, a number of evaluated projects must be available, in order to design the standardization in a correct way. Since the exact cost for BREEAM at a project is hard to estimate, all of NCC's ongoing BREEAM projects should be carefully compiled. Then it is possible to estimate a cost for a future BREEAM project in NCC and standardize the process. The vision is to always have an internal BREEAM expert involved in the projects even if an external assessor is appointed, which can be seen as costly. But in return, the company is always up to date on the market since external assessors are involved in the BREEAM process in other companies. Thereby, new knowledge and solutions regarding BREEAM can be exchanged. However, this is a way for NCC to control the process and be integrated in the decision-making of what categories and subcategories to fulfill in order to contribute to the standardization process.

A dilemma which can be seen with standardizing BREEAM in the construction process for NCC PD is the managers' vision to be able to supply various ECSs to the investors. When integrating BREEAM in the construction process and then adopting another ECS by a request from an investor, it will result in more work and thereby an increased cost. However, this may be a way to get the customer to choose the system that NCC has chosen to invest in.

From NCC Construction there is a request to work in partnering in the BREEAM projects with NCC PD. This could contribute to increased cooperation between NCC PD and NCC Construction with shared goals, activities and economy in the projects. The grey zone, which a top manager from NCC PD talks about, could thereby be more easily overcome. The vision of a more unified NCC could then be achieved, where no individual business area gains more than the other. However, it could lead to reduced profitability for one of the business areas, but at the same time, the risks to invest in a new system are shared.

## **Conclusion**

This paper explores the implementation process of an environmental classification system (ECS) in a construction company, in this case the ECS BREEAM in NCC. It draws on a case study where different levels of the organization have been interviewed in order to investigate the complexity of the system and how it affects the construction process as well as the organization. To invest in ECS can be seen as the right move for NCC, since the demand from society has increased and the market for ECS has grown. Due to the fact that ECS has become a hygiene factor; an essential part in the construction process, it is a trend showing a strong link between the environment and business. The social and ethical benefits of adopting BREEAM are clearly shown since BREEAM has a life cycle approach of the construction process. However, the

economic benefit is not shown in profitability today, but rather in market advantages for the future. Due to the already advanced implementation phase of the ECS, NCC will have a competitive advantage on the market when the demand for ECSs increases. Among the interviewees, NCC is considered as one of the Swedish leading companies regarding environmental classification. To work according to an ECS is a clear label demonstrating awareness of the environment. The targets in NCC's sustainability strategy are all included in BREEAM, therefore it can be considered as a comprehensive ECS which NCC has motive to further develop.

In the study, it has emerged that classifying according to BREEAM adds an additional value to the building, with increased environmental performance and increased quality. However, BREEAM contributes to more administrative work for all concerned parts, especially the projects. It is also possible to notice that the interviewees see NCC as being in the forefront of the implementation process of the ECS BREEAM. The general view from the interviews establishes an optimistic outlook and a unified view regarding a strong potential of developing the ECS. The opinion among all interviewed groups is that the ECS will remain in NCC. Therefore, it can be worthwhile to further expand the ECS in the company. NCC's vision to standardize BREEAM into the construction process can be seen as an attempt to further expand and control the ECS in the company. However, some environmental focus can be lost when the environmental aspects are given less priority, to the benefit of reduced costs and less administrative work.

The implementation of BREEAM in the organization is today in the stage that Lewin calls "moving" since the change process has been accepted by the employees and the system has started to be adapted to the construction process. To ease the work regarding BREEAM, the importance of communication is emphasized. This can reduce the ambiguities and resistance towards the implementation. Since the construction projects are spread out and often are isolated, it is even more important to have good communication.

## Recommendations

In order to improve the BREEAM process in NCC and ease its implementation within the organization the following recommendations are given:

- **Increased support**  
By further developing universal company templates, checklists and standardized documents, the administrative work at each project can be minimized. NCC should collect the documents at an electronic data base, a BREEAM portal. It is here that previously approved BREEAM documents from BRE should be gathered and a forum for questions and dialogues should be established. A person responsible for the data base should be appointed, preferably a BREEAM expert, ensuring that questions are answered within a reasonable time frame.

- **Evaluation of classified projects**

When BREEAM projects are completed and have received a classification from BRE it is important to evaluate the results. Variables such as costs, environmental benefits, work load, and customer satisfaction are important to evaluate in order to know which categories to invest in for the future. This is also an important factor since NCC's vision is to standardize the process, and by evaluating the classified projects the standardization can be performed in a correct way.

- **Clearer communication**

Clear communication is important since the organization is spread out. The projects are often isolated and when there is a lack of communication regarding BREEAM this can result in duplication of work and resistance to changes. There is a demand to increase the communication and cooperation in all directions. This can be achieved by organizing specific BREEAM conferences and inspiring lectures and workshops.

It is also important to point out and clearly communicate that working according to BREEAM is a part of NCC's sustainability strategy which all business areas work towards. Furthermore, NCC's leading position and knowledge regarding BREEAM can be more clearly communicated to society.

- **Partnering**

By introducing partnering as a part of the BREEAM projects the cooperation between NCC PD and NCC Construction can be improved. Since BREEAM is a new and complex system, shared goals, activities and economy in the projects contributed to collaboration. Then a unified effort towards BREEAM, where the grey zones in the projects are more easily overcome, can contribute to a more unified NCC where no individual business area gains more than the other when putting effort in BREEAM.

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