

“Coming together is a beginning. Keeping together is a progress. Working together is a success. If everyone is moving together, then success takes care of itself.”

- Henry Ford

Research report on Colas Aalborg

How the efficiency and effectiveness of different teams in Colas Aalborg can be improved?

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Synopsis:

The following report is focused on finding the factors that are threatening the productivity growth of the construction industry, investigation conducted on an asphalt company in the city of Aalborg, Denmark.

The research was based on the mixed method of investigation, both qualitative and quantitative information research.

The purpose of the report combines theory with personal findings in the effort of providing useful resolution that can be implemented by the scrutinized company.

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Preface

The present report represents the project work conducted for the master thesis on the 4th semester of Master in Management in the Building Industry at Aalborg University. The report work has been conducted in the period of February 1st to June 1st 2016, under the supervision of Associate Professor Erik Bejder, according to the programs current curriculum. The report is based on knowledge gained during the period September 2014 – January 2016, concerning the courses affiliate to the education. Furthermore, information for the project was acquired through personal experiences, specialized literature, knowledge gained from the project supervisor and through the collaboration with Colas Aalborg.

The report is aimed to give an answer to the research question: “**How is the project team composed to make good projects?**”, with a focus on “**How can the efficiency and effectiveness of a team be improved in order to lead in a larger scale to productivity growth in the construction sector?**”, investigation conducted on teams inside Colas Aalborg. The report is meant to answer to the secondary questions, formulated to give a better understanding of the research question:

- How is the cultural background important in the effectiveness of a team?
- What are the elements that transform a group into a team?
- How can the efficiency and effectiveness of a team be improved?

The report is structured on 5 chapters, as follows:

1. Introduction
2. Descriptive phase + Problem formulation
3. Analysis + Solution
4. Conclusion
5. Further research

Acknowledgements

I would like to express my gratitude towards my project supervisor, Associate Professor Erik Bejder, who offered me his support throughout the period of the project. Furthermore, I express my appreciation towards the whole staff from Colas Aalborg that was kind enough to provide me with the needed information. Special thanks to Thomas Jørgensen, Jesper Jarl Børsting and Anders Fynboe who helped me to put together the pieces of the bigger picture that Colas Aalborg is composed from.

Reading guidance

In order to have a clearly structured project, the report is going to follow the guidance of the Logical Framework Approach – LFA. The LFA can be used as a set of tools to analyze an objective-based project, gathering several steps that have to be followed in order to assemble a well-designed report that will be described objectively. As the LFA was planned to be used during the creation of design projects and not university reports, the method will not be followed to the core, but it will offer guidance in order to make the report easy to read and understand.

In order to get an understanding of why the LFA was chosen to give the guidance for the present report, some of the advantages of the approach that are benefiting the present report are listed below: [Kari Örtengren. 2004]

- It is making sure that fundamental questions are asked while the weaknesses are acknowledged and analyzed;
- Constitutes a framework for an organized analysis of the interconnected essentials leading to a well-designed project;
- Is facilitates a better understanding of the project by offering a clear and organized view over the information presented.

The LFA consists of two main sections: the analyzing stage and the planning stage, detailed in the figure 1.1.:

Analysis phase	Planning phase
Stakeholder analysis - identifying & characterizing potential major stakeholders; assessing their capacity Problem analysis – or “Problem Tree”. It consists of identifying key problems, constraints & opportunities; determining cause & effect relationships Objective analysis – or “Solutions Tree”. It consists in developing solutions from the identified problems; identifying means to end relationships. Strategy analysis – identifying different strategies to achieve solutions; selecting most appropriate strategy.	Developing Logical Framework matrix - defining project structure, testing its internal logic & risks, formulating measurable indicators of success Activity scheduling – determining the sequence and dependency of activities; estimating their duration, and assigning responsibility Resource scheduling – or “Budgeting”. from the activity schedule, developing input schedules and a budget.

Fig. 1.1. Stages in LFA [Delevic M., 2011, p13]

As previously mentioned, the report is meant to be objective-oriented, which implies that the project starts with a problem analysis which leads to the objective listed in the research question and finalize with the choose of relevant solution.

According to [Kari Örtengren. 2004], the LFA method consists of the following steps:

- 1 Analysis of the project's *Context*
- 2 Stakeholder Analyses
- 3 Problem Analysis/Situation analyses
- 4 Objectives Analysis
- 5 Plan of Activities
- 6 Resource Planning
- 7 Indicators/Measurements of Objectives
- 8 Risk Analysis and Risk Management
- 9 Analysis of the Assumptions

The steps 5 to 9 are referring to the planning stages of a real life design project and therefore will not be approached in this exploratory research-report.

The steps are interconnected, as the method does not presume clearly separated stages following a chronological order. The LFA steps are connected through a interrelationship, as progressing into the project, some newly discovered factors may change the previous analyses described in the along different steps.

Furthermore, the different steps will represent a read thread of the information found in the report, introducing the reader into the analysis. The first step in the LFA is the context analysis presented along the first two chapters: Introduction and Descriptive phase, where the project's situation is presented, along with the background information needed to get to the research question.

1. Introduction

An overview of the concept of team-work will be presented and also its early stages of development. Furthermore, the argumentation of why the problem was chosen to be addressed will be presented, together with the secondary research questions which will pave the path towards the answers for the main research problem.

1.1. Introduction to the “team concept”

“When spiders’ webs unite, they can tie up a lion”.

An old Ethiopian saying.

Individual workers vs. team work throughout the history

A commonly accepted definition of a *team* refers to a group of people working together to achieve a common goal, by exercising complementary skills. Looking back in history, it could be said that human kind started to work in teams even from the beginning of the human existence, when men realized that is more effective to hunt in a team, than as individuals. By having different skills, every man was designated a specific role, e.g. the weakest man in the team was supposed to make noises to scare the animal that was being hunt, and the stronger men were supposed to capture and hunt it down. Later on, based on the same principles, tribes were formed. Even from the beginning of the human kind, people realized the importance and the benefits of working in teams and having roles among the team members. As a reinforcement of this statement, one of the strength points of Sacramento and Chang West [Sacramento C.A., Chang M. –W. S., West M. A., 2006], is that the survival chances of human are increased if people are working with each other, overcoming their individual limitations.

The beginnings of the concept “teamwork” started in the 1920’s. Following a read thread in the history, during the Industrial Revolution in the 18th century, individual work, e.g. of craftsmen work, was replaced by work in groups, in large factories in order to promote the rise of mass production and reduced costs.

In 1911, Taylor made a reference in his work “*The Principles of Scientific Management*” [Taylor F. W., 1911] to Roosevelt, the president of The USA at the moment, who said that all the people at the time recognized the importance of conserving the material resources of the planet, but the loss of human effort was less visible, as Roosevelt called it “lack of national efficiency”. People were working more and more trying to overcome their own results, effort that was taking them to their limits, while the focus was on the outcomes and not on the ways they could improve themselves to get the better results. The lack of national

efficiency was referring to the fact that people were working hard on manual works and that they were reaching the limit of their development as individuals.

Taylor addresses this lack of efficiency. How the lack of efficiency can be treated by acknowledging that the workforce has to be trained for the specific tasks, instead of the existing demand of trained men. In the attempt of optimizing the working process, machines had to perform simplified routines and workers had to do actions in a row without mutual interfering, in order to improve their performance and obtain better results.

In other words, Taylor recognized the necessity of giving roles to the workers and getting them trained to fit specific work. The working process can be optimized if each member has his own part of the work to be responsible for, and where he will give his best to fulfill the job, not interfering with other men' work. Taylor also studied the time required to perform a task, and analyzed the less amount of movements needed, in order to standardize the work itself.

The principles he developed sustain the science instead of the rule of thumb, harmony instead of discord and the development of each man to his greatest efficiency. He called his solution *a Systematic Management*, which became a part of the Classical Management System, whose principles are applicable to all human activities e.g. management of houses, farms, or businesses. The systematic management becomes the theory of management of work applicable in order to maximize the efficiency in productivity, focusing on the development of the individuals working in groups.

This method was used successfully during the 1920's and it was adopted by many corporations. Though, during the 1930's, the model started to be questionable, as it raised problems in the workers relationships with work. The problems were mainly caused by the lack of flexibility when changes were implemented, or by the fact that the workers were hard to motivate.

As an effect, the *School of Human Relations* emerged with the purpose to emphasize people, increase their performance and improve the corporations' productivity. Mary Parker Follett in her work "The new State" [Follett M. P., 1920], underlines the significance of motivation among workers and the conflict management. In the same way, in "The Human Problems of an Industrial Civilization" [Mayo E., 1933], Mayo studied the productivity in work and the behavior of the workers. The conclusion of his research was that people which were a part of a team with "esprit de corps" were more motivated and supportive with each other.

This is how a difference between *a group* of people and *a team* started to be noticed: a group is just a formation of people gathered for one common purpose. A team is a concept regarding a group of people gathered for a common purpose, exercising complementary skills, sharing similar values, cooperating and helping each other towards achieving their goal.

“A team is a group in which the jobs and skills of each member fit in with those of others as in a jigsaw puzzle, pieces fit together without distortion and together produce some overall pattern.” [Garner E., 2012]

1.2. Research question

Seeing the evolution throughout the time of the team concept, it is interesting to see how teams are functioning inside a real company nowadays and analyze what can be done in order to improve their efficiency and effectiveness. As human beings, when we reach the peak of our capacities, we seek other ways to improve even more. In this way, the research question of this project arise: “**How is the project team composed to make good projects?**”.

Secondary research questions

As the research question can be seen as a broad subject, it was decided that it will be analyzed with the help of the following questions, which will frame the road towards the final goal:

- How can the efficiency and effectiveness of a team be improved?
- What are the elements that transform a group into a team?
- How is the cultural background important in the effectiveness of a team?

2. Descriptive phase

Introduction

This chapter gathers information about how the research and the data collection have been directed. Also, information about the purpose behind the interview and questionnaires will be described. Lastly, knowledge gained about Colas Aalborg gathered during the interviews, the annual report from 2015 and internet sources is detailed.

2.1. Scientific Approach

A literature study has been conducted with the intention to intensify the quality of the surveys. Three articles served as research point for the methods this report research were made. The first of the articles [Forza C., 2002] is addressing the problem of limitations of survey-research and also the “Exploratory survey research”, providing initial confirmation in the primary phase of the investigation, and “Confirmatory survey research” addressed towards explicit purposes. Therefore, the project will be conducted as explanatory research. The second article is concentrating on survey research and establishes the foundation for “good survey research practices” [Manoj K. Malhotra; Varun G., 1998], while the third article used is referring to how to analyze data after collection [Gail F. Fahome, 2002].

2.2. Data Collection

The focus during the data collection was on the qualitative research, where interviews with representatives of Colas Aalborg were conducted. However, quantitative research was directed in form of questionnaires, where the emphasis was on sorting features in order to construct statistical models in order to describe what was observed in teams of workers on different sites.

Cooperation

As previously mentioned, the project is based on collaboration with one department of Colas Denmark, situated in Aalborg. The district manager – Thomas Jørgensen, the construction manager – Jesper Jarl Børsting and senior contract manager – Anders Fynboe, along with the foremen of two site teams together with their members contributed with the research information needed through face to face meetings, phone calls and also emails.

Interviews

In the exploratory stage of the project, the interviews were held face-to-face or by phone. It is considered that the answers of a person responding to the questions are not necessarily objective, as the answers were limited to the level of knowledge of each person or their experience. Furthermore, the interviews were recorded for internal use, to guarantee that, if the case, confusions can be retraced.

Questionnaires

The questionnaires have an introductory part which is meant to help the respondents understand easier and quicker the quiz. Also, to ensure the comfort of the respondents and in order to avoid the lack of interest of the respondent, the number and length of the questions were well-thought-out.

Furthermore, the questionnaires were anonymous, to ensure the accuracy and reliability of the results. Also, the names of the foremen will remain anonymous throughout the report. The teams will be referred as Team 1 and Team 2.

Lastly, the triangulation method was used as a safety check of the reality of the respondents' answers, by having questions on the same matter spread throughout the quiz, while similar questions were asked towards the foremen of the teams.

Due to the fact that the working teams are formed by Danish and international men, the questions were written both in English and Danish in order to ensure the fact that the crew members understand correctly the meaning of each question.

In order to find the view of the crew members over the collaboration inside their team, a questionnaire has been handed on to two teams. The number of teams was decided by the contract executive in Aalborg, Jesper Jarl Børsting, on the premises that only two of Colas' foremen are speaking the English language. Due to the fact that the author of the present report has knowledge of Danish language only at a conversational level, an interview with a foreman in Danish language would have posed problems of misinterpretation of the answers.

The content of the questionnaire contained simple questions with "Yes" or "No" answers, questions in which the answer was a rating from 1 to 5, and lastly open answer type of questions. In the end of the questionnaire there was specified that if there are any comments or additions related to the subjects in the questionnaire, the respondents are welcome to write them down. In this way, the respondents were not limited in the expression of their thoughts. The questionnaire contained a number of 17 questions, and a sample can be found in Appendix on page 58.

2.3. Introduction to Colas

The company that was decided to be the case of this project is Colas Denmark, an asphalt company with one of the departments based in Aalborg.

2.3.1. Getting to know the company – history



Société Routière Colas was initiated in 1929 in France by the collaboration of Shell and Société Générale d'Entreprises (SGE), with the purpose of operating “Cold Asphalt”, which gives the name of the product “ColAs”, a bitumen emulsion patent used in addition to road works. During the next decade, Colas had gained a great success in the market and expanded geographically its operations to western Africa and the French Caribbean. Until 70's, Colas expanded even more their borders to Canada and the United States by acquiring local companies and creating subsidiaries, and also expanded their business to include road safety equipment. Throughout 80's and 90's, the development is even more accelerated and the group expanded into North America, Europe and Asia and Australia, and incorporated other activities in order to ensure the vertical integration, through acquiring a large number of gravel pits in the operation areas in order to ensure the supply chain of raw materials. By this time (2016) Colas became a leader in the construction and maintenance of transport infrastructure within the global road industry. [Colas Denmark – Annual Rapport 2015]

Nowadays Colas is operating in more than 50 countries along 5 continents, as it can be seen in the figure 2.1.:



Fig 2.1. Colas' spreading around the world [www.colas.com]

In Denmark, Colas began its activity in the 30's, when the Shell Group bought the rights to sell and manufacture the bituminous binders. The company was named at the moment "Colas Vejmaterialeaktieselskab", changing its name only later in the 1993 in Colas Denmark A/S. By this time, the company already started its first factory of hot asphalt mix; a network of asphalt plants were built over the entire country, focusing on the areas with urban and industrial growth; regional centers were opened, with factories, engineering offices, workshops and laboratories.

2.3.2. Colas Denmark



In 1995 Colas Denmark A/S was acquired by the French mother group Colas SA, and became a part of one of the world's largest infrastructure groups. By 2005, Colas Denmark decided to reduce their activities to the core operations, focusing only on the production and application of asphalt mixes for road building, due

to the strong competition in the Danish and Nordic construction market. In 2014, Colas acquired Skanska Asphalt A/S, one of their previous competitors.

Colas Denmark brings together approximately 500 employees in departments spread all over the country (Årsrapport 2015). The group is divided into 2 big divisions, Division West and Division East.

Division west has departments in:

- North Jylland
- Middle and West Jylland
- South and East-Jylland and Fyn

Division east has departments in:

- North Sjaelland
- South and Vest-Sjaelland
- Copenhagen city



Fig. 2.2. Colas in Denmark [www.colas.dk]

The geographical position of the departments is shown in the figure 2.2. Further on, the project is focusing only on the department of North Jylland, which is divided into three sectors:

- The office, composed of the sales and execution departments placed in Nørresundby;
- The asphalt plant, placed in Nørresundby;

Due to the limited research time, only the first mentioned sector of the North Jylland department will be investigated. Though, a short introduction to the plant staff is following.

Due the meetings it was learned that that plant staff if formed of a team of 5 people, with working hours from 06:00 to 14:00. The plant manager, Torkild Frandsen, may have variations in his schedule, depending on the workload. He is the responsible for the general operations at the plant, being the one making sure that the sufficient amount of materials are always prepared to be transported at different sites. On the same time, the plant manager is responsible for quality control and also for ordering the raw materials for the production of new asphalt. The other 4 men are having different roles, as in charge of loading, mixing, machineries and office responsible.

It was said that in the eventuality when a staff member is missing from work one day, any other member can take over the work of the missing colleague, the absence posing no problem. When one question occurred about what happens if the plant manager is absent, the answer was that the second in command takes his place and all operations go normally. Also, it was stated that the plant manager's absence was never too long to pose problems.

The conclusion after the meeting is that the plant team works in synergy, having less to no problems of communication or cooperation, showing good results in productivity.

2.3.3. Organization

Just like in any other company, in Colas are several functions that have to be attended, e.g. the client acquisition, tendering, maintenance, execution, which have an impact on the company's economy. These functions can be divided into different roles, as it is shown in the figure 2.3.

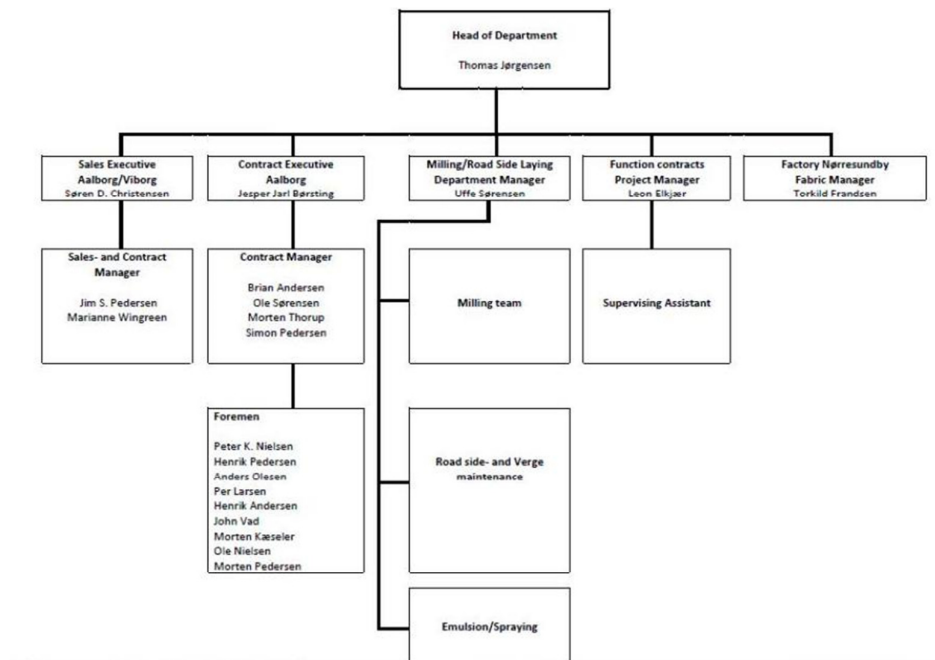


Fig. 2.3. Colas Aalborg - Organization [Colas Aalborg, 2016]

The chart shows exactly who is in charge of specific departments, and also which are the lines of command. The lines of command are important to be known and recognized in order to avoid unnecessary confusions on responsibilities. When responsibilities and leadership are clearly defined, the working force is more motivated and productive, and so there is greater opportunity for the progress and improvement of the company.

The company has five different departments, among which:

- Sales Department
- Execution Department
- Milling/ Road Side Laying Department
- Function Contracts
- Nørresundby Factory

The sales department is in charge with the “tendering part”, making an offer, and after a tender is won, they transfer all the information to the execution department. The handing in towards the execution department is depending on the size, duration, or complexity of the project. There is a general procedure that has to be followed, where the project is simply passed to the execution department with all the information required, drawings and all the indication of what needs to be done. In case of a more complex project, the departments of sales and execution can stay together in a meeting for up to two, three hours in order to go through and clarify drawings and all the details that are important for the project. The question about communication problems between the two departments arouse, but it was clarified that since 2010 as a head of department in Aalborg, he never encountered problems between the two departments. It has been stated clearly that between the sales and execution department is not a “big wall” of bureaucracy, but a close connection regarding communication and cooperation, and the information can go back and forth until everything that may be blurry gets solved out.

2.4. Stakeholders identification

The second step in the LFA method is referring to the stakeholder analysis. The stakeholders in Colas regarding the research question will be further on identified.

A stakeholder can be defined as an individual, a group of people or a company which have a significant interest in a specific matter and can exert an influence on the matter, directly or indirectly. The focus questions that are to be answered during the analysis are:

1. Who are the stakeholders whose problem the present report is analyzing?
2. Who will benefit and how from the proposed solution of the report?

Considering the research question, “**How is the project team composed to make good projects?**”, the relevant stakeholders from Colas are represented by all the staff of the company. Focusing on the department of North Jylland, the staff is spread into different smaller departments, as previously explained in section 2.3.3. *Organisation* of this report.

In order to answer to the first question in the stakeholder identification, the stakeholders covered when analyzing the research question are groups of people gathered into teams, forming two departments, listed below:

- The sales department staff
- The execution department staff

Going deeper into the hierarchy of the organization, there can be observed that the foremen under the execution department and along with their teams are also an important part of the stakeholders and will make one big part of the research of the present report.

The second question asked in the stakeholder identification process referring to who can benefit from the result of the report. As the objective of the report is to analyze how different teams are composed in order to find methods in which the teams can be improved to be more efficient, on a smaller view, the first who benefit are the working teams, as the collaboration between them can be improved in order to raise the efficiency and effectiveness of the team. On a larger view, the ultimate beneficiary will be the company as a whole.

2.5. Problem Analysis – the problem tree

Going deeper into the project, the third step in the LFA method is referring to the problem analysis, which, according to [Kari Örtengren. 2004] stands for four basic questions:

1. What is the key problem that has to be resolved?
2. What are the reasons of the problem?
3. What are the effects of the problem?
4. Who is affected by the problem?

A common way to resolve a problem analysis is to draw the “problem tree”. This method is facilitating the process of visualization of the causes and effects of the focal problem, or how diverse problems are interconnected.

In the figure 2.4. it is shown how the problem tree resembles to a real tree.

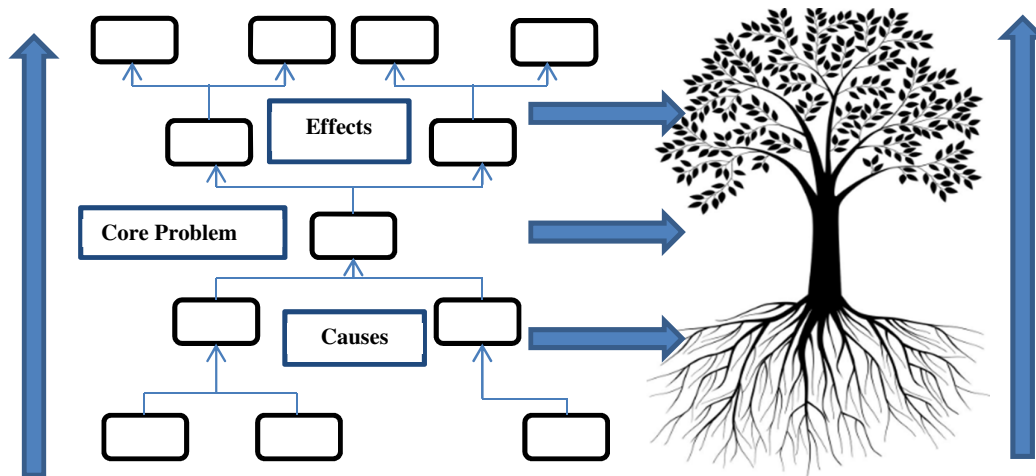


Fig. 2.4. Problem tree draft

Just in the way a real tree's leaves are supplied with nutrients from the roots through the trunk, a problem tree has its roots in the causes of the problem evolving in consequences.

In figure 2.5. it has been composed the problem tree associated to the research question. Starting with the research question "how is the project team composed to make good projects?", due to the fact that an efficient and effective team is leading to the the team work behind a good project, the reasons that may lead to uncohesive groups with a mediocre collaboration have to be analyzed, in order to be avoided.

The core problem become so that uncohesive teams and mediocre collaboration lead to poor performance through lack of focus, disrespect and unresolved conflicts, effects that are going to be examined later on in the report. The causes to the presented effects in the problem tree are theoretical causes to the core problem, and constitute the basis for the investigation over the working teams in Colas Aalborg.

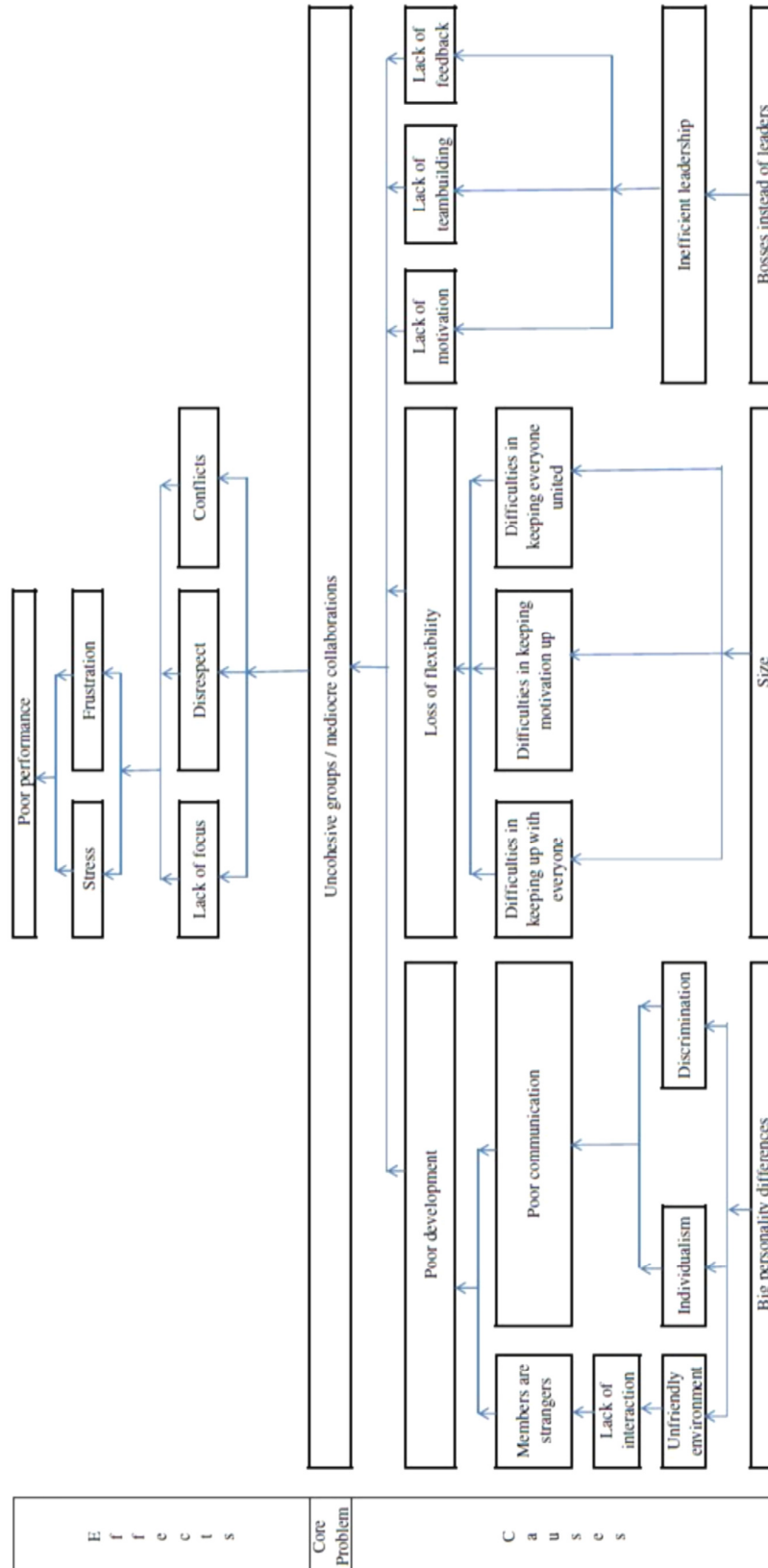


Fig. 2.5. Problem tree - Uncohesive groups / mediocre collaborations

2.6. Objective analysis – objective tree

After the problem tree is completed, the “Objectives tree” can be formed, similar to the draft in figure 2.6. The objectives tree is the positive reverse image of the problem tree, as it illustrates the solutions expressed as positive achievements. [Kari Örtengren. 2004]

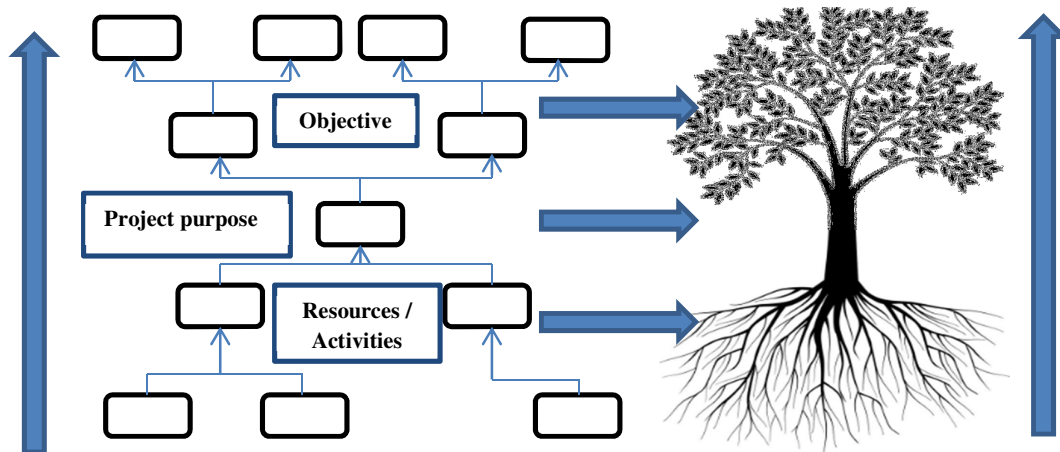


Fig. 2.6. Objectives tree draft

Therefore, the objectives are clarifications of what the project is going to accomplish.

Similar to the problem tree, the objective tree in figure 2.7. contains theoretical components that are verified throughout the report.

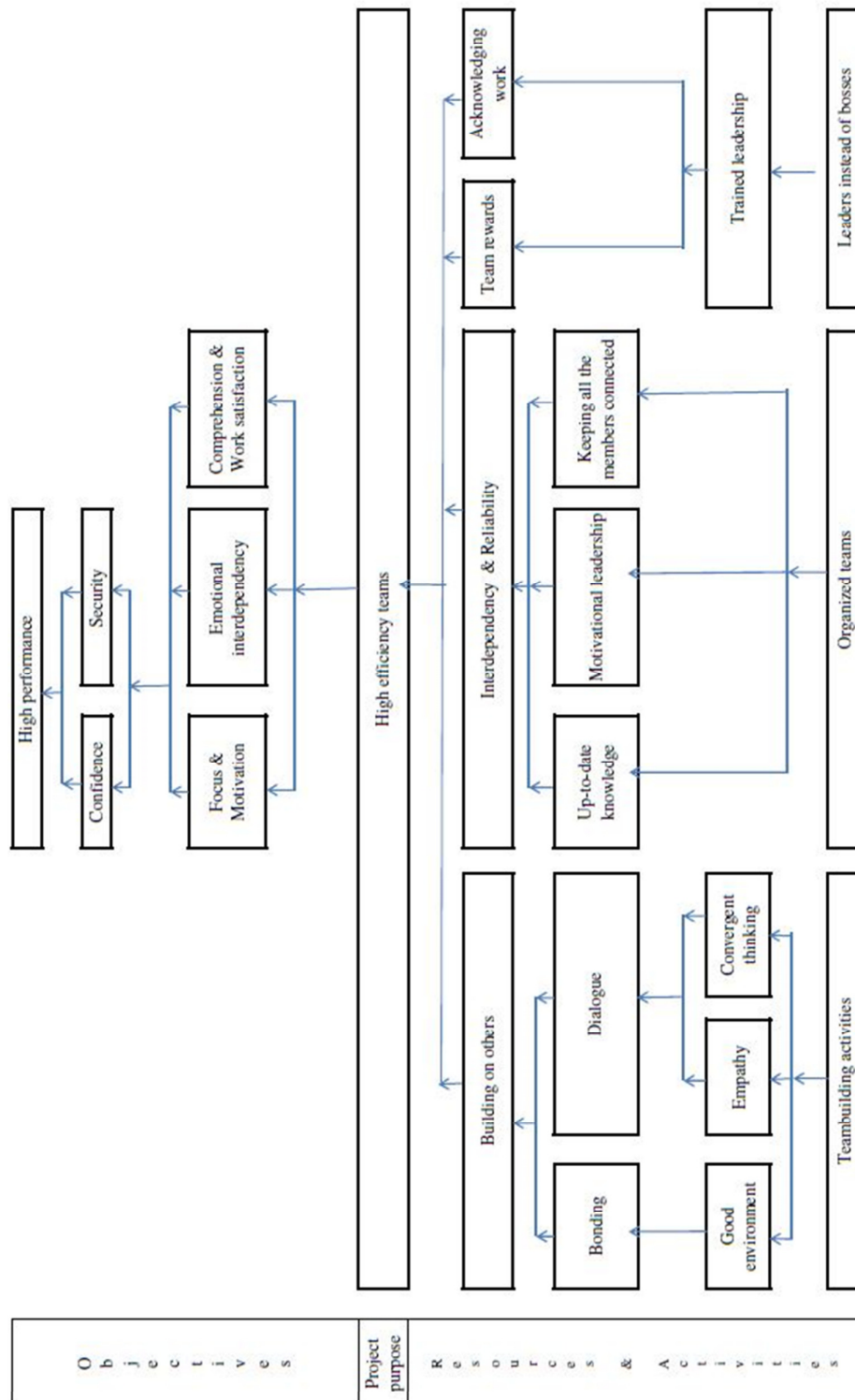


Fig. 27. The Objectives tree - High efficiency teams

2.7. Conclusion LFA

With the completion of the present LFA, an overview of the core problem of the report has been presented. The LFA is necessary prior to the beginning of the research question analysis, as it stands as a base of information for the entire investigation. Further on, a study is conducted on Colas Aalborg, considering the terms previously presented.

As presented in the first meeting, the teams constituting the asphalt plant and the office don't pose problems regarding collaboration between the members. But, as the crews that work on different sites were not mentioned, it was decided to go into a more detailed investigation regarding the collaboration between its members, by setting interviews with the foremen and preparing questionnaires for the crews. On the other side, the collaboration between Colas and its clients may have a great influence over the overall performance of the company, so an interview was set with the head of the department in order to clarify questions.

3. Analysis

Introduction

This chapter will offer the reader an overview of the Danish construction industry and the factors that can influence the productivity growth of a company. Further on, an analysis of the different methods of collaboration between Colas and their clients, as well as the collaboration between the members of the working crews on the sites; will be conducted. The purpose of the analysis is to discover ways to improve the collaboration between different parties, in order to boost the productivity growth of the company.

3.1. Danish construction industry (collaboration forms in the construction industry)

A general accepted definition of the construction industry is a sector of the economy engaged in the preparation of the land and construction, alteration and repair of buildings, or structures. [<http://www.businessdictionary.com/definition/construction-industry.html>] Contractors and consultants are working together in order to develop the industry.

The raising number of people coming in Denmark increases the problem of housing, and therefore, the construction sector develops by the need of renovating old buildings or through the design and execution of new projects. In the same time, the infrastructure sector met a strong investment from both public and private financiers and it's forecasted to grow by an average of 2.3% until 2024. [BMIREsearch 2016] At the moment, the construction sector is among the biggest sectors in Denmark, equivalent to 5% of Denmark's economy, involving about 170,000 people. [The Danish Ministry of Energy, Utilities and Climate; 7 Nov 2015]

3.2. Factors that influence the development of the Danish construction industry

According to a European Union's report in 2015, the productivity growth in the construction sector has been weak in the last 20 years, due to e.g. strict building regulations, or sustainability requirements. [Country Report Denmark 2015] Therefore, there is an official observation that there is room for improvement in performance in the construction sector.

But what are the factors that can influence the productivity growth? There can be high prices compared to the countries in the neighborhood which leads to too less foreign companies on the Danish market; or even small investments in projects. But in this report it was chosen to be discussed the labor productivity as a main reason of the weak productivity growth. The human factor plays an essential role in the development of the industry, due to the fact that the increasing demand for development requires a bigger stress on the way the projects are managed and executed. The latter requires a good collaboration between all the parties involved in the process, starting with the client, the designing team of a project, and straight to the working teams on the construction site, aiming to achieve the best possible framework for optimal planning and execution, and to minimize the risk and the unforeseen events through a good cooperation. By achieving all these, the goal is to obtain a satisfactory result

for all the parties involved, considering the economy and the quality of the outcome, delivered on time.

The cooperation between the parties involved in a construction process can be analyzed from two perspectives: the client's point of view vs. the contractor, or the company chosen to design or execute a project, and also from the point of view of the workers on the site. Furthermore these two aspects will be discussed.

3.3. Cooperation between clients and contractors

3.3.1. Cooperation looked from the Danish tender act and general conditions – GC's – clients vs. contractor's point of view

At the moment in Denmark there is no specific legislation regarding to how contracts in the construction sector should be written or handled. But due to the fact that construction projects usually contain similar rules to be followed, the "General Conditions" – GC's – came as a framework, supporting the tender of a client. GC's are agreed documents which make all the parties involved to play accordingly to the same rules, not favoring any specific party. As stated, the GC are general conditions that have to be accepted by the parties involved in the process, agreed on before the contract was made and included as a part of the contract. Although, whenever the state funds are involved in a project, the price and time circular applies, which states that GC92 (regarding the execution of projects) should be used by default.

The GC's are standard contracts meant to balance the terms and conditions between a client and a contractor, and not a description of what or how a project should be. It offers a set of rules that have to be followed. In other words, it facilitates the relationship between the parties by giving a set of guiding lines that can be followed. Therefore, Colas met the requirements of GC92 several times, when participating in tenders of public clients.

1. Performance bonds

One chapter of the GC's is referring to performance bonds, which, for the client, act as *work guarantee* promised by the contractor hired to perform a project, or as Thomas Jorgensen, the head of the Aalborg department called it, a "safety net" for the client, in the case when the contractor company goes bankrupt. According to GC, the contractor has to release towards the client, in term of 8 working days since the conclusion of the contract, a guaranty as security for execution of a project. The guaranty can stand in bank forms or, as Colas use, insurance. This bond should cover 15% of the total amount of the contract before hand over, and 10% of the total purchasing amount of the contract after hand over. The guarantee

reduces usually (except the case of claiming rectification of defects) again after one year since the hand over to 2%, and after 5 years after the hand over the bond is ceased.

On the other side, the contractor also benefits of a performance bond issued by the private clients, on demand. The bond has to be released in 8 days after the contractor requires it, and should correspond to the average of 3 months payment period, with a minimum of 10% of the contract sum. The bond should be provided in form of adequate guarantee from a bank or savings bank, or insurance. The performance bond issued by the client towards the contractor acts as a *paying guarantee*. Colas never needed to ask the performance bonds from the clients, as the communication to the clients works well and the payments were always done in time. It was also stated that all the clients are initially checked for credits, and if they are not credit worthy, they have to pay for the work ahead, or the bank has to guarantee for them.

In conclusion, one way of securing a good collaboration between the client and a contractor is by issuing performance bonds acting as “safety nets”, offering security to both parties involved.

2. *Qualification criteria*

Another way, in which a client can secure the foundation of a good relation with contractors, is by having qualification rounds before the tender. Through the qualification rounds, the client makes sure that only contractors that can fulfill his requirements will join the tender. By making quality, time, method or facility demands towards the contractors that will participate in the tender process, the client can insure that the offers that will be submitted will be relevant to his needs.

Examples of qualification criteria encountered by Colas representatives are experience, description of how can they, as a company, execute a specific work, or quality demands. During one meeting it was mentioned an eight year contract that was just won in Hjørring, that was awarded for the most financially advantageous offer, and had prequalification rounds. The price in this project valued 50%, and the rest of 50% was awarded in criteria such as description of the work: “how can you, as a company, do this job” and “how will you, as a company, improve this collaboration for the next eight years?”. It was stated that the prequalification round makes a very good way to place the bids, as the client gets exactly what he needs, and proves that the “price is not everything”.

One important detail when a client decides having a qualification round is that the qualification criteria have to be objective and non-discriminating. Thomas specified that he hasn't encountered any non-objective criteria in the tenders Colas participated, since he is the head of the department. The Hjørring project was given as example again, when prequalification criteria were involved. If the client-company would have chosen on their own the winner of the tender, without having an external third party in the person of a consultant to participate in the decision process, then the client-company could have been discriminating some competitors by choosing non-objectively a contractor, e.g. choosing a

local contractor that would help the economy of the municipality also. But, due to the presence of the out-side third party involved, everything went efficiently, and the decision was taken objectively. Though, it was mentioned that sometimes is the client that takes the decision, without the implication of the third party, which makes the things more complicated and the decision subjective, but no examples were provided, as it was stated that in the tender that Colas participated, subjectivity never come upon.

3. Award criteria

The award criteria represent one more option for the client to “choose” the right contractor for the job. The award criteria determine who wins the competition, and in Denmark there are two options: the lowest price and the most financially advantageous offer, based on sub criteria clearly defined. Both criteria are offering the client the opportunity to express his wishes towards what his needs for a project, and therefore determine the kind of contractors that he will be working with.

Colas usually participate in tenders with the lowest price award. The difference made in the offers when Colas participate in one of the two criteria, is that if it is the most financially advantageous criterion, it is all about the description of the work, the innovation that a company can bring in the project, while considering the amount of money that the client is willing to pay. The lowest price criterion is about keeping the project in its lowest financial boundaries. The Hjørring project was mentioned again, as it was won on the most financially advantageous offer award criterion. In this tender, Colas got important points for being able to rely on the experience and innovation in products and techniques obtained through the experience of the mother-group Colas in France and of the branches of Colas from all over the world.

The award criteria give the client the opportunity to influence the final decision of whom is he going to work with, what qualification or experience the winners of the tender will have. In order to have a successful completed project, it is important to have a team of people, whom are on the same mind set and are cooperative towards a greater goal. Thomas added that “as a contractor, you always have to see the goal of the client and identify yourself with it, so you can offer him exactly what he needs. Is it a cheap product, or is it a good collaboration, or what is it that he really wants? You have to understand the goal of the client, and only then put together the offer for tendering. This is what ensures a good collaboration for the duration of the project.”

All these are options for the client which can help him in choosing the right team to work with, and ensure a good collaboration during the duration of a project.

3.3.2. Cooperation looked from the types of contracts existent in Denmark

In Denmark there are three basic contract relations, according to the needs of the client. The client is the one that makes the tender material, according to an early tender, or a late tender.

An early tender implies that the design of the project has not been done; therefore the trade that will participate in this kind of early tender is a Turn Key Contractor – TKC. A TKC is responsible for both design and execution of a project, carrying most of the responsibility and liability that comes along with the project. The client becomes responsible just for the location of the project, facilities e.g. water, electricity, the permissions for the building site and lately he has payment obligations. The relations between the parties involved in the process regarding the legal organization are as relate in the figure 3.1. [Anne Marie Herforth, 2016]:

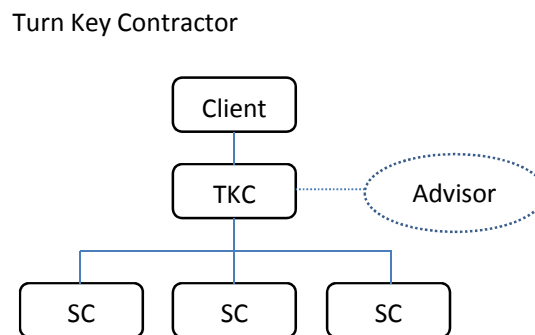


Fig. 3.1. Legal Organization TKC

As it can be seen, the client has direct contract with the TKC, as he did not make a contract with the advisor or the sub-contractors – SC. The TKC becomes a temporary “owner of the project” during the period of the project, assuming risks of calculation, defects or time. Also, for any delay or defect coming from the sub-contractors, the TKC is responsible in front of the client, as the SC respond only in front of the TKC.

Moving on to the late tender, here can be differentiated two basic contracts types: trade-by-trade – TBT – and Main Contractor – MC – , where the client is responsible of the design of the project, the location and the access on the site, facilities, permissions for the building site and the payment obligations. In this case, the MC and the TBT sub-contractors are responsible and liable for calculation of their tenders, defects and time delays of their own work. Visual representation of the legal organization within the late tender contracts can be seen in the figures 3.2. and 3.3.

Main contractor

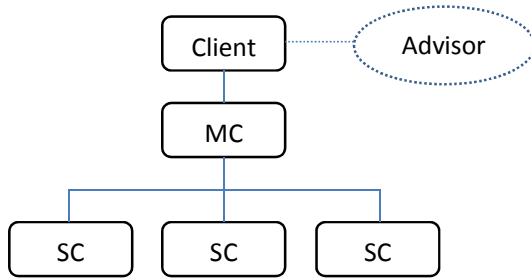


Fig. 3.2. Legal organization MC

Trade-by-trade

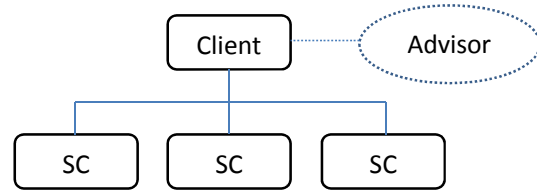


Fig. 3.3. Legal organization TBT

Colas is usually using late tender type of contracts, as they are mainly acting as SC for a MC, or even SC for a private or public client (e.g. The Danish Road Directory). The reason, “it is just the way the things are tendered”. Being a TKC and including the design in the work is not a possibility, as in 2007 Colas decided to divest their operations e.g. manufacturing and sales of concrete paving stones, and “go back to the core activities” consisting in the production and handling of asphalt.

One difference between early tender and late tender that can be noticed from the figures is that the client can cooperate directly with and advisor in the late tender, as the responsibility for design is on him, and the cooperation is direct between the client and the contractors, client-MC and client-SC respectively. Even though Colas is acting as SC, sometimes the use of an external adviser is needed. Colas is using external advisers in the person of consulting engineers for environmental issues and also journalists for re-writing offers when the award criteria is “most financially advantageous”, in order to get the offers more “readable”. External advisers are defined as qualified people in a certain matter hired from the external environment to do a specific job within a project/offer.

All the three types of contracts are basic contracts, which smoothen the partnership between clients and contractors, by setting basic rules in the collaboration. All three types of contracts are specifying clearly the communication flow and set visibly the responsibilities and the liabilities of each party involved in the project. This is one way of ensuring a good collaboration towards the desired results and so towards productivity growth.

However, it was stated that there are always some small difficulties that arise in the collaboration with a client, due to the fact that it is complicated to describe accurately what you want as a customer. “If it is not a road from A to B, it is difficult to describe that you really want”. Not everything is thought to be described into details, but the clients usually describe the way the things have to be handled in the tender, and mostly those procedures are used, leading to a very good collaboration between the involved parties.

3.3.3. Cooperation in working teams – crew members' view

Looking from the contractors' point of view, the productivity growth can be influenced by the efficiency and effectiveness of the teams working together into a project.

As it was stated in the section 3.2. *Factors that influence the development of the Danish construction industry*, the collaboration between the members of working teams can lead to problems in the efficiency of many companies and, similar to the snowball effect, leading to problems in the productivity growth of the construction sector.

Getting to know the teams. Foremen interviews

As mentioned in the section 2.2. *Data collection*, interviews with foremen of 2 site-teams were agreed. Through the 22 questions asked, it was desired to gain knowledge about the collaboration between the members of the crew, methods of motivation of the members and also about the nationality, culture and educational background of the workers.

Both teams are relatively small, as they have 6, respectively 7 people working, including the foremen. One of the teams is formed with all Danish workers, while in the other team there is one worker with a different nationality. Even though there are not a considerable percent of international workers into the teams composition, the nationality of the workers was considered by both foremen to be irrelevant, as long as the person is working and having satisfactory results.

By having one international member in the team, the question about communication arouse. The foreman said that the international member can understand Danish at a conversational level; therefore there is no problem when Danish workers communicate information to the international one. Even so, it was stated that in case the international worker has problems in understanding, he can always come to the foreman for further clarifications.

Also, communication throughout the breaks was questioned, and one of the foremen said that in the breaks every member has its own time, away from the stress from work. The foreman is not exercising his role in the break. He also says that the members feel motivated to come at work when there is a good environment to come to, and when you have to work with a team that you get along with.

When asked about who makes the hiring in the teams, both foremen said that they are the ones responsible for the job; each time having to announce the office about the request, and then they get a number of CV's from which they can choose. In the same time, one of the foremen said that it is not mandatory to choose from the CV's from the office, as one can hire a person that he knows that might be suitable for the job, even though the person didn't have previously a CV registered in Colas. Education or previous experience is not a must for either foremen regarding a new employee. Both prefer to train people in their own style, in this way

forming a person that will also get used to work with the existing team, and eliminating the time of accommodation that someone with previous experience would need in the beginning of the job, as everyone works in their own way.

Due to the fact that, with the new season that started in April 2016, a number of teams did not get any project to work for, the workers from other existing teams were distributed along the teams that started the work. So even if the foreman would have need someone new in his team, he won't hire someone new, because he has to take some of the men that are already hired in Colas, but have nothing to work with their own teams. This was the case of one of the foremen, which, in the beginning, was happy to hear that he will have a new member with experience in his team, as he needed one more man to work with, but the new member is only working in one role, and he is not willing to learn to do something else in the team due to his age. This stays as one sign of weakness for the team and the foreman is struggling to work with in order to resolve it.

The foremen consider that the teams members are feeling motivated and come at work with pleasure, the main reason that one of the foremen emphasized being that they work as a big family. In a similar way, the other foreman compared their team with a marriage. Here are both ups and downs in their team, but always they are working together to solve any problems that might appear and support each other in need. One of the foremen stated that Conflicts sometimes occur, most of the time, when he is not present at the site. When the foreman is not present at the site, a "second to chair" man takes his place as a coordinator of the team. But sometimes he is not the best person to solve a problem and conflicts may arise, and so, when the foreman comes again at work has problems to solve, in order to have everyone happy and keep on working as productive as they can.

When asked if they have teambuilding experiences with their teams, both foremen said that the teams were not involved in external activities together, except the Christmas parties organized in Copenhagen, where all the departments in Denmark are participating. Furthermore, neither one of the foremen considered that it is important to tell their man to often how much their work and effort value for the team, and one of them said that positive feedback comes only in a special day, due to the fact that the good work should be achieved every day. But the constructive feedback is offered whenever is needed, in order to improve themselves, and as a team by getting better result all the time.

As far as the description of a normal working day, the workers have specific roles they play in the team, e.g. some of them are working on machines, and others have to manually level the asphalt. But that doesn't mean that if one man is missing, the work stops. Every role has at least two, three people that can perform it, in order to ensure the flow of the activities, even if someone is not present at work, but also if there is need for help at a certain time.

In conclusion, both foremen are considering their teams efficient and effective, and they are proud of the results achieved together. The relations within the teams are open and everyone can come straight and say when there is a problem, because all the other members willing to help.

The teams

A model of what takes an individual to a high performance team is presented in the figure 3.4. [Storch J., Sørholm T. M., 2005]. In the figure it can be seen which are the competences that members of a team have to fulfill in order to get from individuals, or a group, to high performance teams.

From the left of the image towards the right, the intensity in which these competences are present in a team can be weighted. For example, if a team doesn't have a common target and value, it is clear that they are just a group of people working together, but they have nothing in common with a team that is investing their best skills and all their efforts into achieving the common goal and having the feeling of reward that he may get through his own work and through his team good performance.

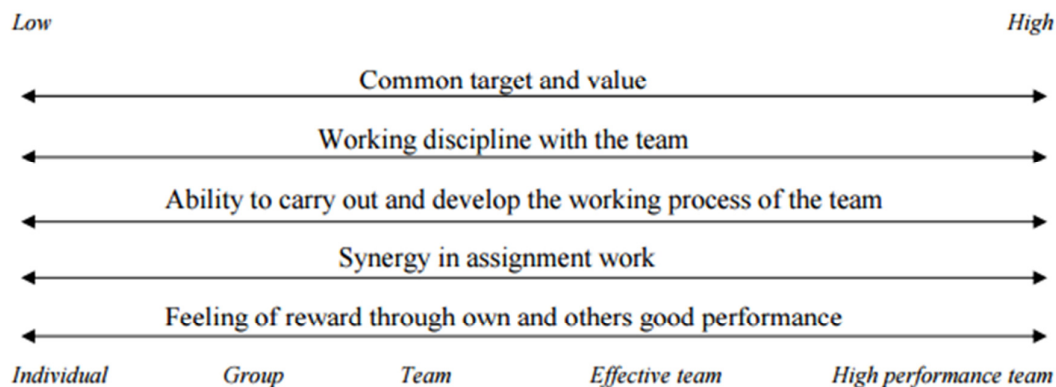


Fig. 3.4. From individual to high-performance team [Storch J., Sørholm T. M., 2005]

The model shows that not any ordinary people can be put together and expect from them to work as a team. Each member has to commit to the work and cooperate with the other colleagues in order to get a higher result than as individual could get on its own. In addition, just as the head of the department in Colas specified before, the sharing of a common goal and view over the work is one of the most important abilities before starting the actual work.

In order to get an assessment over the crew members working on sites, they were asked to give a number from 1 to 5 to the characteristics in the model, where 1 means that they agree (high association), and 5 that do not agree with the statement (low association). The statements are listed below:

1. You and your team members have common target and values regarding the working process.
2. You comply with working discipline inside the team.
3. You have the ability to carry out the working process.
4. You are working together with the team members towards fulfilling the assigned work.

5. You feel reward in your own work.
6. You feel reward in the team's good performance.

The answers were grouped in charts according to the teams and showed in the following charts.

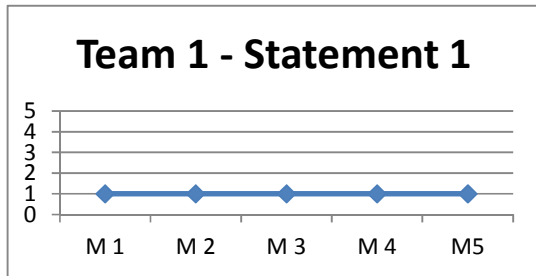


Fig. 3.5. Ratings of Team1 at statement 1

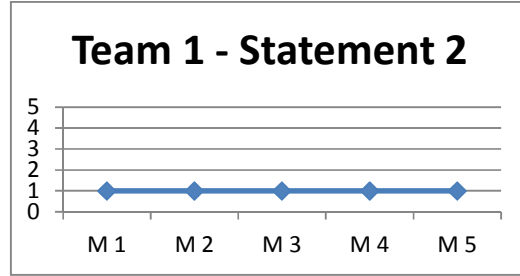


Fig. 3.6. Ratings of Team1 at statement 2

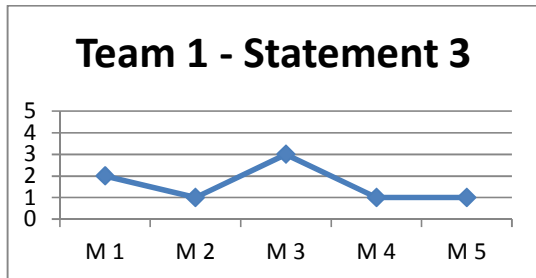


Fig. 3.7. Ratings of Team1 at statement 3

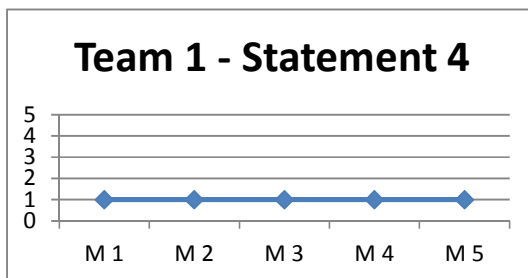


Fig. 3.8. Ratings of Team1 at statement 4

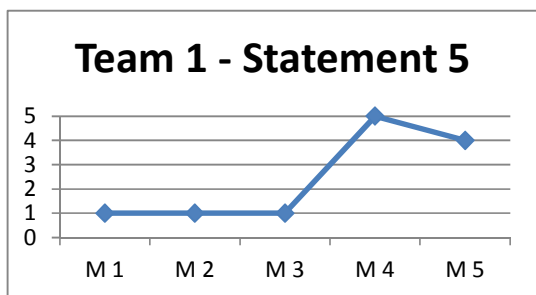


Fig. 3.9. Ratings of Team1 at statement 5

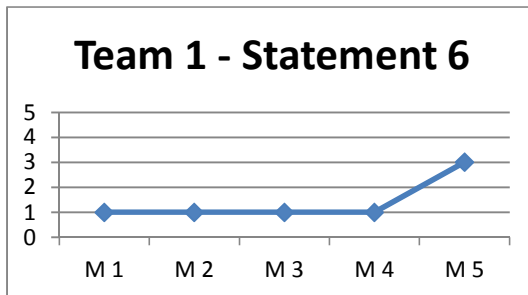


Fig. 3.10. Ratings of Team1 at statement 6

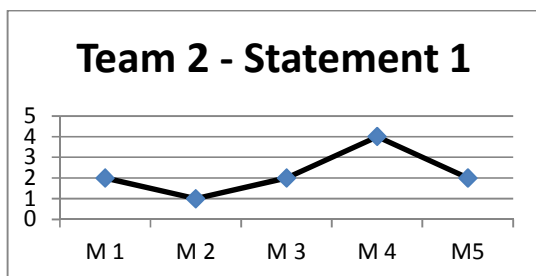


Fig. 3.11. Ratings of Team2 at statement 1

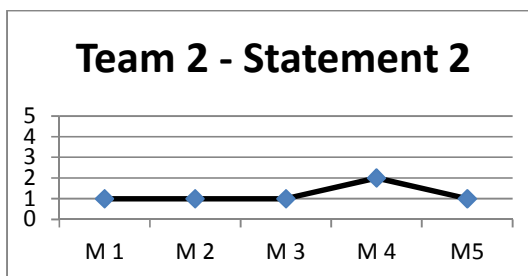


Fig. 3.12. Ratings of Team2 at statement 2

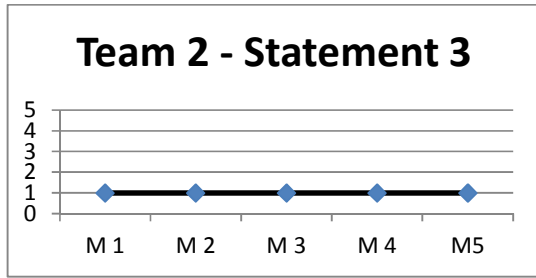


Fig. 3.13. Ratings of Team2 at statement 3

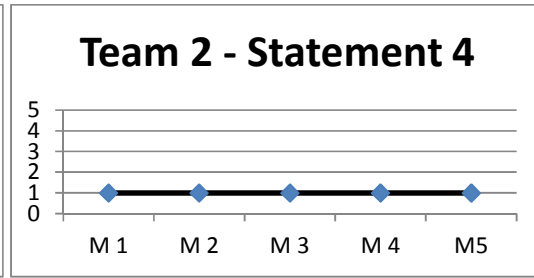


Fig. 3.14. Ratings of Team2 at statement 4

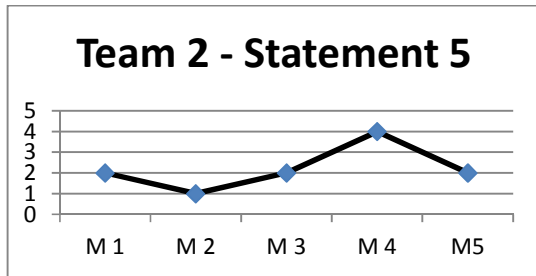


Fig. 3.15. Ratings of Team2 at statement 5

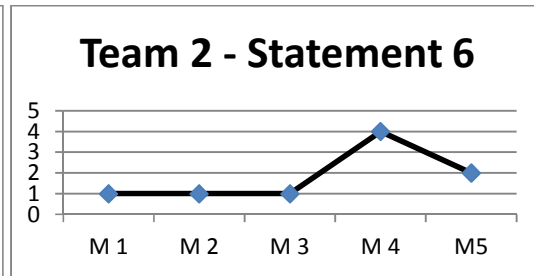


Fig. 3.16. Ratings of Team2 at statement 6

In the graphs where the answers are all corresponding to the grade 1, it means that the members of the crews are being positive, while the statements were all formulated in a positive view, and the crew is associating themselves with the affirmation they answered.

Team 1

It can be seen that in statements 1, 2 and 4 all members are agreeing that they have common goal, they agree with the working discipline and whenever one needs help, all of them work together to get the job done. Furthermore, statement 3 is revealing that two out of the five members don't feel that they have the ability to carry the work process, meaning that there is room for improvement in this matter. Lastly, when answering to statements 5 and 6 about feeling reward in their own work and the work of the team, the majority of the team has a positive view and admitting that they take pride in their work, while two of the members are not pleased with their own work, rating the statement with 5, respectively 4; and regarding the team work, one of the member rates it with 3, expressing a feeling of mediocrity.

Comparing the results with the scale of high-performance of Storch and Sørholm [Storch J., Sørholm T. M., 2005], it can be seen that team 1 is an efficient team, but there is place for furthermore improvement in the future.

Team 2

In team 2 it is noticed a slight difference comparing to team 1. The differences can be based on the age of the team members or on the experience of working together in a long period of time. All the members feel that they have the ability to carry on the working process and they are helping each other to make the work done, according to statements 3 and 4. But some differences appear in the statement 1, where team 2 has four members that are not feeling 100% that they are having common targets and values. The same happens in the case of statement 5, where four out of the five members admit that they don't take fully pride in their work.

Comparing the results of team 2 with the scale of high-performance of Storch and Sørholm, it results that team 2 is an efficient team with minor points to improve. Both of the teams are showing efficiency and potential for high-performance.

Next, the crew members were asked to assess the level of the following circumstances where 1=high and 5=low/never:

1. Respect
2. Help
3. Conflicts
4. Confidence / Trust
5. Discrimination
6. Good environment
7. Equality
8. Communication
9. Satisfaction
10. Appreciation
11. Criticism

Their answers are presented in the following charts.

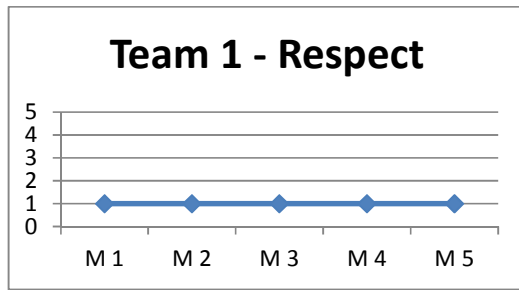


Fig. 3.17. Ratings of Team1 regarding "Respect"

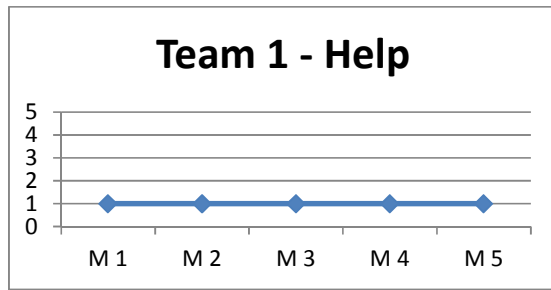


Fig. 3.18 Ratings of Team1 regarding "Help"

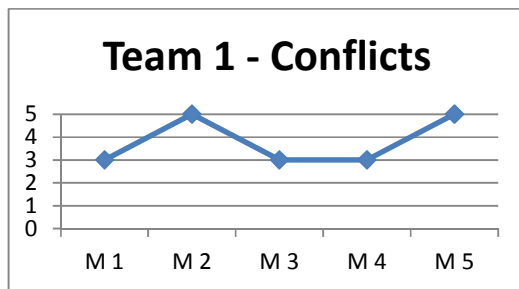


Fig. 3.19. Ratings of Team1 regarding "Conflicts"

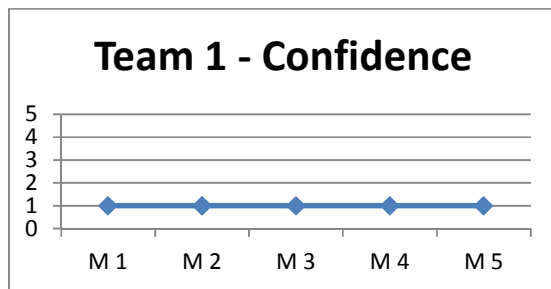


Fig. 3.20. Ratings of Team1 regarding "Confidence"

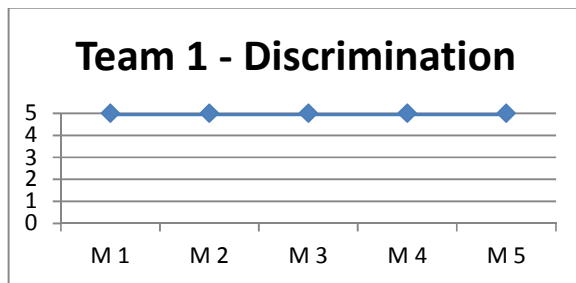


Fig. 3.21. Ratings of Team1 regarding "Discrimination"

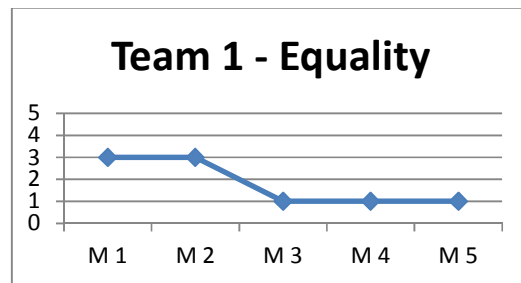


Fig. 3.22. Ratings of Team1 regarding "Equality"

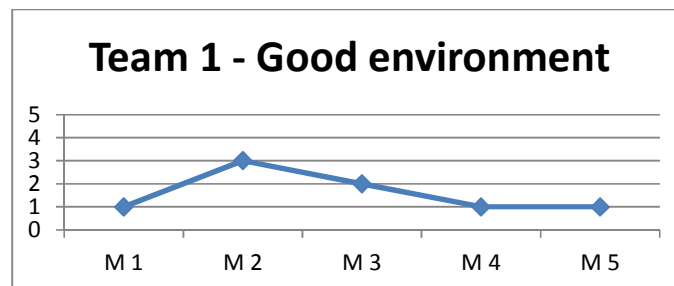


Fig. 3.23. Ratings of Team1 regarding "Good environment"

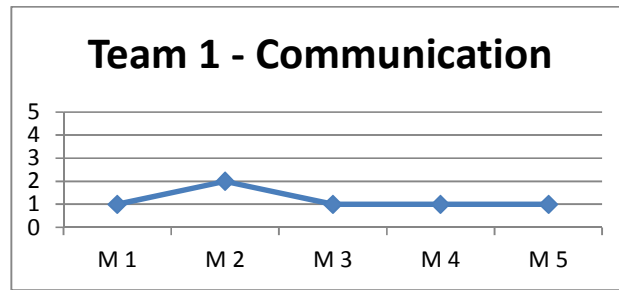


Fig. 3.24. Ratings of Team1 regarding "Communication"

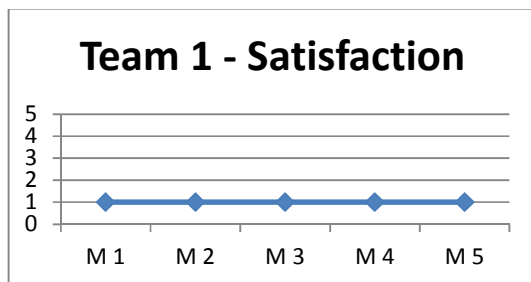


Fig. 3.25. Ratings of Team1 regarding "Satisfaction"

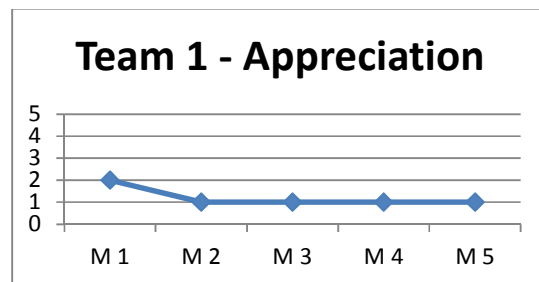


Fig. 3.26. Ratings of Team1 regarding "Appreciation"

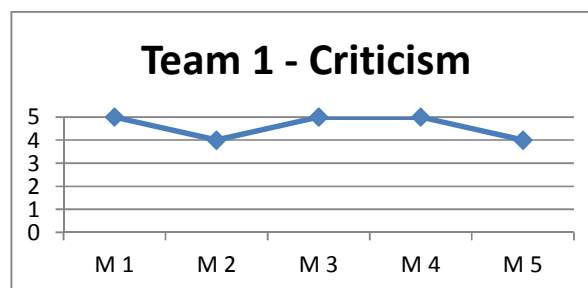


Fig. 3.27. Ratings of Team1 regarding "Criticism"

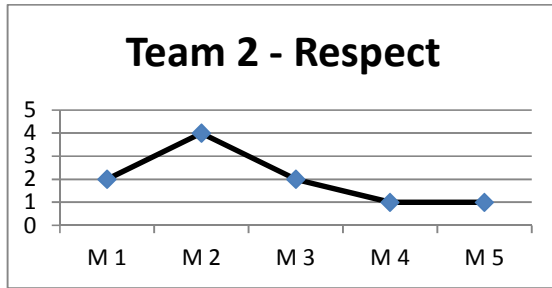


Fig. 3.28. Ratings of Team2 regarding "Respect"

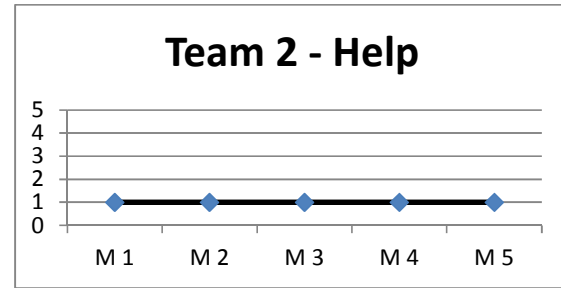


Fig. 3.29. Ratings of Team2 regarding "Help"

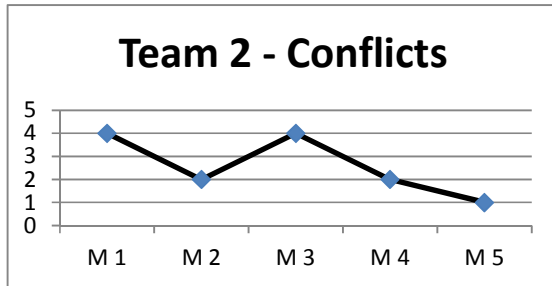


Fig. 3.30. Ratings of Team2 regarding "Conflicts"

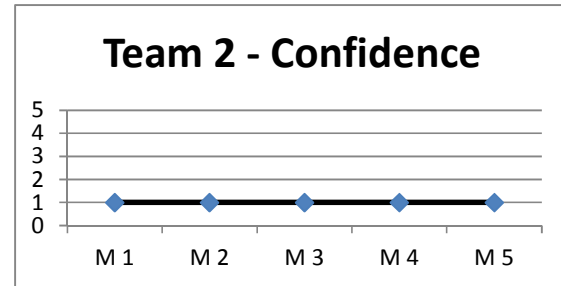


Fig. 3.31. Ratings of Team2 regarding "Confidence"

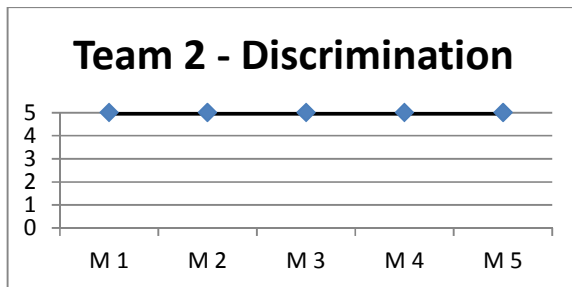


Fig. 3.32. Ratings of Team2 regarding "Discrimination"

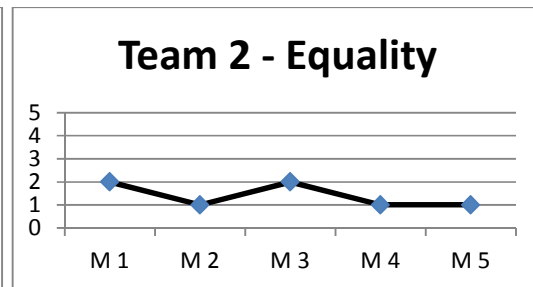


Fig. 3.33. Ratings of Team2 regarding "Equality"

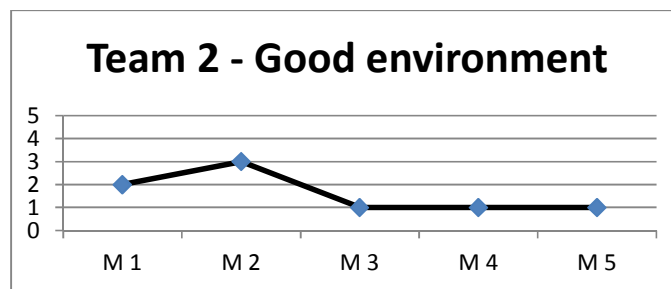


Fig. 3.34. Ratings of Team2 regarding "Good environment"

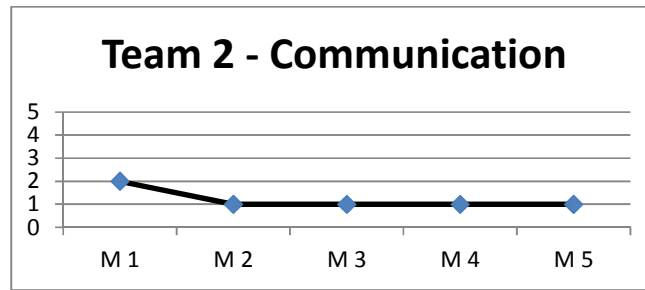


Fig. 3.35. Ratings of Team2 regarding "Communication"

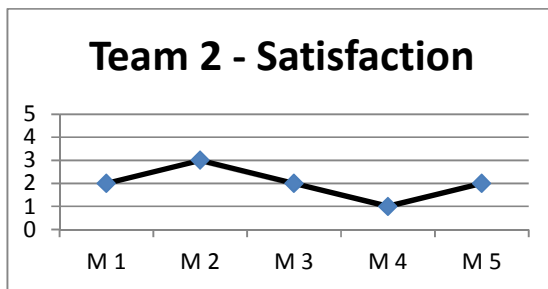


Fig. 3.36. Ratings of Team2 regarding "Satisfaction"

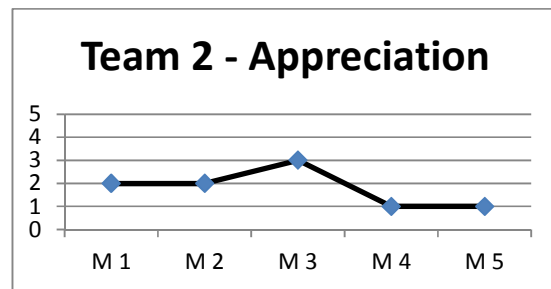


Fig. 3.37. Ratings of Team2 regarding "Appreciation"

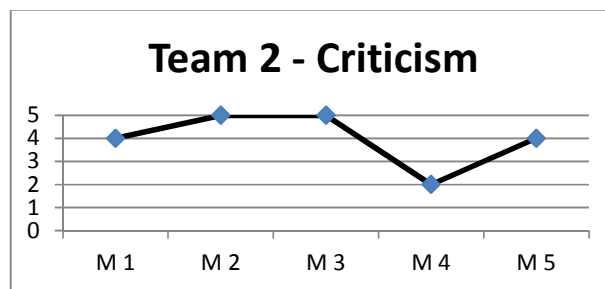


Fig. 3.38. Ratings of Team2 regarding "Criticism"

It can be seen that the two teams have different visions over the presented characteristics. A common conclusion is that neither of the team has encountered problems regarding discrimination, no matter if it would be connected to age, nationality. Also, both teams scored high regarding communication, enhancing two other circumstances, help and confidence. The fact that the members are being able to talk openly is building trust and is encouraging them to ask and give help whenever needed.

A big difference between the two teams comes in when talking about respect. All the members of team 1 scored high the respect, as being a part of their usually days at work. On the other side, in team 2, three out of the five members scored lower than 1, which can raise some questions about what the reason might be. But also looking on the satisfaction,

appreciation and criticism charts, all these results may be the consequences of problems with the respect.

In both teams it was spotted a discrepancy in the way the members rated the equality and the good environment levels, which lead to the impression that there is place for improvement. The graphs of conflicts and criticism show that the teams could work on the bonding aspect, in order to learn to share their emotions and thoughts in a more constructive way.

Further on, the questionnaire had the role of finding the thoughts of the working men on matters already discussed with the foremen. Questions about experience before employment, education, communication inside the team, teambuilding were asked. The questions that have not been previously discussed in the report are listed below, questions meant to find as much information in order to respond to the secondary questions of the report.

1. When did you start working in Colas?
2. Did you have any previous experience in the field?
3. Did you have any professional training in Colas when you started?
4. Do you communicate with your team members when you have a work related problem or do you try to solve it by yourself?
5. Do you have non-Danish colleagues? Are you communicating? What language do you use?
6. Do you communicate with your colleagues during breaks?
7. Do you share general information (as tv news) or ideas during breaks?
8. Do you have external team activities with your colleagues?
9. Do you know each other outside work?
10. Are you an efficient team?
11. What are the strengths and weaknesses of your team?
12. Do you ask for help when you need it or do you consider it is a sign of weakness if you can't figure something on your own?
13. Do you feel accepted, a part of a team?
14. What is your age?
15. Do you feel that you have communication problems in your team? Can you give an example?

The workers range of age is from 25 to 56 years in team 1, and 31 to 60 years in team 2. By having such big ranges, the experience in Colas is also very broad, as some of the older workers are employed in Colas for more than 20 years, and the younger ones working from only two years ago. They also have experience in the same team, as team 2 has three members that have been colleagues for eight to ten years.

One general conclusion is that neither of the teams have members with previous experience in the asphalt field before getting employed in Colas. Only two members of team 2 admitted that they had a two year training as vejafaltør (asphalt worker) after they got employed.

Due to the fact that they are in the same team for the minimum of two years, all the members of the two teams stated that they feel comfortable in asking for help when they cannot do something alone at work. One of the workers even stated that in the beginning of his work in the team, he used to see the ask for help as a weakness, but in time realizing that working together is only helping the team, and now he has an open relation with the other members. If he encounters a problem, he tries to solve it by himself, but if it is surpassing him, he just calls for help on one of his colleagues, or the foreman.

From the questionnaire it resulted that all the members are communicating with each other not only work related subjects. Therefore, while relaxing or taking lunch during breaks, they are bonding with information outside the work, by sharing news or ideas, and therefore getting to know each other better every time. Any other time outside work, the members are not getting together, and not knowing each other outside work. Small exceptions are when two workers play football together, or other two are riding home together due to the fact that they are living in the same city.

Everyone said that they consider their team to be efficient, and that they feel accepted inside the team. This comes in contradiction with the results from the Storch and Sørholm's test earlier described. This poses a question in why were the workers dishonest, and is there a problem causing of the change of answers?

3.4. Observations

During the investigation, a series of observations were done on both the working crews and their foremen, and will be presented in the following section.

By having the interview with the foremen before meeting the working crews and handing them the questionnaires, the first impression is that the teams are working perfectly together, have no problems, and are 100% efficient.

When asked about what would they change in the teams in order to improve them, the foremen could not find one single reason to change something. But after the analysis of the questionnaire, it can be seen that the members of the teams have a slightly different idea.

The members do think that they are part of efficient teams, and that communication is one strong point in their work. A good communication and collaboration is what keeps them motivated to come to work every day. But discrepancies arise in the part of conflicts and criticism. Even if the communication is good, conflicts still arise. What is the reason? Even if the foremen state that the team is like a big family, why is there criticism?

A general observation made on the teams is that they are efficient, but they can be improved to high-efficiency, with the right tools. When the foremen were asked if they motivate the workers, if they make sure that the workers know that they are appreciated for their work, or when asked about external activities, the answers were “no” to each question. This may be obstacles in their way to improvement. Furthermore, when asked what obstacles are in the way of their team to develop, no clear answer was given. This may lead to the thought that the foremen are satisfied with how situations are going now, not putting work into thinking about development or improvement of the teams.

In the next chapter, a solution for these problems is presented, putting together steps into **“how is the project team composed to make good projects”**, and furthermore, **“how can the efficiency and effectiveness of a team be improved”**. The purpose of these questions is to boost the productivity growth of the company, and applied to a larger scale, the productivity growth of the entire construction sector, research proposed for further investigation based on a starting point in the present report.

3.5. Solution

A study conducted by Garner [Garner E., 2012] shows how an effective team is different from a group by pointing some different aspects:

1. Teams develop personal relationships.
2. Teams offer encouragement and enthusiasm for its members.
3. Teams are offering different forms of synergy, therefore constantly growing and improving.
4. Teams have unifying activities.

When analyzing the working crews in Colas, room for improvement was noticed. In general the members have no other connection than related to work while not having external activities to bring them closer in order to get to know each other and their ways of thinking; and motivation does not necessarily exist as the feeling of not having appreciation, disapproval or disrespect and dissatisfaction is present among the members.

The already mentioned study of Mayo [Mayo E., 1933] in the beginning of the current report is bringing into attention that a team has to fulfill certain needs in order to be able to evolve and offer to its member's high efficiency. Among the need Mayo identified there are:

- *Achievement needs*, where the team works together to create synergy. **Y**
- *Social needs*, where the team represents the place where its members can explore bonding and friendship. **X**
- *Recognition needs*, where the members of the team are constantly reminded when doing a good work, driving them to the feeling of accomplishment and to the wish of giving more of their efforts. **X**

- *Learning needs*, when the members are learning from each other's experience and growing together through success, but also through mistakes. **X**
- *Freedom needs*, where the members are feeling themselves during work and accepted as a part of the team, not having to try hard to fit into a specific role. **Y**

The points marked with an **Y** are points that, after the analysis of the teams, have been found present in the spirit of the questioned teams.

The points marked with an **X** are points that are not present in the questioned teams and can represent focus points that could be developed in order to get more united and efficient teams.

3.5.1. *The 3A's*

The needs identified by Mayo are thereon supported by John Maxwell [Maxwell J., 2001] who comes with "team laws" generally applicable to all teams. He said that in each team there should be high degree of communication, the goals and vision of the teams should be shared by all the members, and that the leader should challenge and motivate the members in order to help them to grow together.

The conclusion is that the foremen, as being leaders of the working crews, have the duty to help the teams develop through making right interventions. For example, the 3A's audit can apply. The 3 A's stand for *appreciation*, *acceptance* and *acknowledgment*. As resulted from the analysis of the crews, the members of both teams feel accepted as part of the teams. But when talking about appreciation and acknowledgment, the members recognized that they are not shown signs of appreciation, as also the foremen stated that in order to let the men know that they are valued parts of the team and recognizing their efforts it is done only when something special happens, as any ordinary day should be treated with efforts to be a good day. The lack of the two components of the 3A's may lead to the 3C's, which stand for Criticism, Complaining and Condemning. As none of the members admitted that condemning exist in their teams and there was never the case of complaining as the communication is open, the criticism got high score when talked about, and being one of the important issues that have to be investigated by the foremen and changed into a more positive creative feedback. In this case, the workers won't feel that they are being blamed for a specific matter, but they will understand that the feedback received is a way of improving their actions and work towards personal growth inside the team.

3.5.2. *Team meetings*

But not only the foremen are the ones responsible for the success of their teams. The team members have to confront a series of challenges in order to overcome the obstacles that might show up. Individualism is one of the biggest threats to teamwork and team development. The action of putting themselves before the teams needs will definitely pose an obstacle in front of team growth. Also, individualism can lead to conflicts, and unresolved conflicts are blocking the teams' improvement, as they are time wasting, exercise criticism and bringing

frustration to the members. One step towards a more bonded team can be the organizing of team meetings. As the foreman of one team stated that he and his team has meetings before the start of a new project, where they plan activities but also discuss possible problems, the result of that team are more positive than the other team, which did not have meetings. Even if meeting sometimes may be looked at as chores or interruption from work, they are beneficial due to the fact that the members interact not only on a professional level of work; but also on a personal level, where they are being together, communicating and growing as a team. All the frustration and unresolved conflicts can be addressed during meetings, while feedback can be provided in a friendly relaxed environment that favors a good understanding of each other, releasing the stress gathered within the relationships between the workers.

An example of successful meetings consists of the meetings arranged at the office once a month. At the meetings is present the head of the department, representatives of the execution department and all the foremen of the site crews. The subjects of the meetings are focused on the progress of the ongoing projects, achieved milestones, but also problems. By having all the parts involved in the meetings, solutions for different problems are discussed and later on implemented. By having more people involved in the process of problem-solving, there is a better chance of having more original ideas. On the next meeting, the implementation progress of the discussed problems is debated and, if necessary, the solution is modified to fit the situation better.

3.5.3. Leaders' performance

A good way of paving the way for an outstanding good team, with good collaboration and positive results, is to ensure they have an appropriate leader. The leadership style of the foremen over their team is as much as similar as the performance of a sports team leader which is directly reflecting on his team's results. Meaning that, if the foremen are not good in being leaders, they will not be good in motivating the team or knowing how to push the limits of the men in order to have great achievements. Being leaders, they have to be able to make their team put their best while performing their jobs while motivating them and allowing them to find job satisfaction. But one of the most important functions of a leader is to be able to improve the team towards greater performance while having same constant resources and same workforce. [Garner E., 2012]

Leading challenges & styles

Challenges appear for the leader when thinking about tasks, team or individuals. Which one should go first? A leader has to find the balance between the three elements forming the teamwork, best illustrated by Garner : "Teamwork is like riding a bicycle. You can only move forward if you stay in balance". Different styles of leadership appear from the percentage of each one of the three components weight. A directive style of leadership forms when the leader is putting the tasks over the needs of the team or individuals; a consultative style forms when the leader involves the team in the decisions that concern them; and lastly, a delegated style appears when the leader assigns tasks according to the individuals and their capabilities.

3.5.4. Teambuilding

The challenges earlier addressed can be overcome by having Colas enroll the foremen into coaching sessions during the period December - April, while the working crews are sent into unemployment benefits due to the fact that the company does not operate in the winter time. Usually, in the months of December – January, the foremen and the crews participate in different courses chosen by the company. The suggestion of enrolling the foremen in coaching sessions is due to the advantages that come out of the courses, some of them listed below:

- Improve the ability to communicate the messages stronger;
- Improve the skills of reading and understanding the team members;
- Create a foundation for good communication;
- Learn to integrate a positive and inspiring outlook on work;
- Learn and exercise effective tools to create a change.

This type of courses which are offered in Aalborg by NLP Aalborg [www.nlpaalborg.dk], or Coach Vision [www.coachvision.dk] can give the foremen an overview of what a real leader should be. The foremen in Colas do not have leadership experience or education, their previous background being as workers inside the working crews, which evolved over time to be their leaders.

Regarding the team, teambuilding activities are suggested. The teambuilding refers to activities made together by the members of a team, outside their usual working environment. The teambuilding is focused usually on two aspects: the first one of evaluation, how are the members working together to overcome certain obstacles or just fulfilling specifically goals, with the purpose of finding faults that have to be rectified in order to improve the team and make it grow. The second purpose of the teambuilding is to merge the team. To make the team members know each other better, learning how each one thinks in different situations outside work with the final purpose of creating a trustful environment for the members where they get to know how they can rely on one another on work situations.

As the outcomes of teambuilding have been questioned over time, different researches show how teambuilding and in essence team work is important for the improvement of the performance of a team: “research on instructional design theory and, more recently cognitive, metacognitive, and macro cognitive theory, collectively suggests that team training is indeed useful for prompting meaningful change and in helping teams achieve performance levels deemed effective by organizational stakeholders” [Salas E., DiazGranados 2008].

The results of the study of Salas, DiazGrandos and Klein conducted on 2650 different teams are revealing that “team training interventions are a viable approach for organizations to take in order to enhance team outcomes”. The study proves that teambuilding improves cognitive outcomes, the affective outcomes, teamwork process and the performance outcomes.

As a solution for the Colas Aalborg teams and their foremen, the previously mentioned companies NLP Aalborg and Coach Vision offer teambuilding sessions for groups, but also

other companies in Aalborg such as Teambuilding.Dk [www.teambuilding.dk], or Teambuilding Aalborg [www.teambuilding-aalborg.dk] are offering teambuilding sessions according to the needs and specifications of the client.

4. Conclusion

Based on the facts presented in the section 3.5. *Solution*, it is safe to say that by having efficient and effective teams will result into good collaborations with satisfactory outcomes for new projects. This report has been showing throughout its course that teams exist from the beginning of humanity, and throughout the time the concept of team work have been suffered changes. Finally it is coming to the state where it is globally known that teamwork is the key towards progress in the majority of the business and industries nowadays, proof being the fact that more and more organizations are putting an accent on the collaboration between their employees.

As presented in the problem tree, working teams in Colas Aalborg were questioned in order to decide if they are cohesive teams or if they have just mediocre collaboration within people working in the same place. As the research question of the report is questioning how teams are composed in order to make good projects, the questioned teams in Colas Aalborg were first analyzed to see if they are working as teams, and if they fulfill different requests according to diverse literature reviews presented throughout the report.

In order to analyze the working teams, a theoretical problem that may occur in different teams, was detailed in the section 2.5. *Problem Analysis – the problem tree*. Concluding the study conducted regarding the causes of the core problem analyzed in the problem tree, the teams in Colas don't have problems regarding the size of the teams or big personality differences. Even though, the members do not know each other at a personal level, which may pose as an obstacle in the road of achieving high efficiency teams. On the other side, the foremen of the teams are satisfied with the present work situation, so they do not put a lot of effort in getting more efficient. The lack of continuous motivation towards the workers, lack of feedback or the lack of teambuilding are causes that lead to mediocre collaboration in the teams, from where the impression of possibility for improvement was concluded by the author of the report.

The solutions presented in the report are based, as also pictured in the section 2.6. *Objectives Analysis – the objective tree*, on teambuilding activities and leadership. Issues were found connected to both workers and the teams foremen, therefore solutions were provided accordingly towards both parties. Inside the teams, issues connected to lack of motivation, interaction and lack of feedback were found, which may pose as causes for disrespect in the team, stress and unresolved conflicts, criticism or frustration. Towards the presented causes and effects it was proposed for the foremen to hold meetings with the workers where the relation between all involved can become more opened and the members have the perfect opportunity to express their concerns and also their satisfaction related to the working performance and the team. Towards Colas as a company, it was proposed to engage their personnel into teambuilding experiences, which can make the participants to know each other better and through this create a better working environment. The teambuilding doesn't have to include only the working teams, but the staff from the office also, as members of sales department and execution department can also benefit from the experiences.

Regarding Colas, it was also proposed to offer and involve their foremen into sessions where they can learn how to be leaders. The foremen can learn to apply studied and proved techniques which can improve their capabilities and skills, and will enhance their coordination and managing style towards team improvement and high performance.

5. Further research

Due to the fact that the author of the report cannot have interviews in the Danish language, only two out of the nine foremen in Colas were interviewed. The conclusion of the report is based on a small amount of information; therefore, it would be interesting for a further investigation to get a perspective of all the foremen and all the teams that are working in Colas Aalborg. This would be also a certainty test that the solutions proposed towards the workers through the report are indeed necessary and are not only involving a minority of the workers. A subsequent study would focus the necessity of teambuilding on a larger scale and furthermore the improvements of teambuilding over the teams.

Furthermore, leading from the present report, it would be interesting to learn if other companies are facing similar problems within the teams of workers. The result of such a study through the implementation of the solution would really lead to improvements in the construction industry, and why not, with small steps, to the productivity growth of the entire sector.

Even more, it would be interesting to study other factors which are influencing the productivity growth of the construction industry, as the present report is only focusing on collaboration, communication and the improvement of efficiency and effectiveness of teams.

Finally, due to the fact that there were not found problems regarding the collaboration between Colas and their clients, and therefore no improvement solutions were found relevant to make, it would be interesting to analyze the cooperation between other sub-contractors working with main contractors or straight with private or public clients. The reason for the proposed idea stands due to the fact that there are a number of problems in cooperation between the parties which have to be resolved ultimately in the civil court or the arbitration court. If the sector is studied in detail for a longer time and also on a larger scale, solutions could be found which would boost productivity and make a better, simpler collaboration and working environment.

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7. Appendix

7.1. The foremen

Interview foremen

1. How many people are in your team?
2. What roles do they have? (What do they do in a regular day?)
3. What nationalities have your team members?
4. Do you consider that the nationality of the workers is important in the cooperation between the team members?
5. Does it matter if they are qualified or not, or if they have previous experience in the field?
6. Who is making the hiring in your team?
7. Which are the criteria of hiring?
8. How important is the Danish language in your team?
9. If the case, do Danish and international team members communicate during work and in the breaks?
10. Do the team members feel motivated to come to work? (ex. Good environment)
11. How does a normal day go? Do you have a routine? How do you get your everyday tasks?
12. Are you and your team exercising external activities? Teambuilding?
13. Did you ever have conflicts in your team? Did you need to intervene? How did it go?
Did you have to report them to a superior?
14. How are you communicating with the office? Can you describe the flow of a new work that you get? When do you get it, how (tablet), what happens next, machinery)
15. What would you like to change in future project regarding your team?
16. How do you see the team:
 - All the team members have common target and values regarding the working process.
 - There is a working discipline inside the team. (everyone respects the rules, hierarchy etc)
 - All the team members have the ability to carry out the working process. (everyone can solve by their own the task that they get with no problem)
 - All the team members are working together towards fulfilling the assigned work. (when there is need for help, they help each other)
 - All the team members feel reward in the team's good performance. (they feel motivate and proud after a job is completed)

17. What could be the obstacles that may affect your team from becoming more efficient?
What are the weaknesses of your team?
18. What are the strengths of your team?
19. Do you consider your team efficient?
20. Do you tell the team members how much they value for the team? Do you constantly remember them that they are appreciated for the work they do?
21. Do you provide feedback to the team? Positive (to motivate) or constructive (to help them improve)?
22. Do you feel proud in your teams work?

Foreman 1

1. There are seven people in the team, including the foreman.
2. Everyone has specific roles that they do every day, e.g. some of them are on machines, and others have to level the asphalt. But that doesn't mean that if one is missing the work stops. Every job has at least two, three people that can perform it, in order to ensure the flow of the activities, even if someone is not present at work, but also if there is need for help.
3. Only Danish in the team.
4. Nationality doesn't matter. Is the work that matters?
5. He prefers to have a not skilled person and get to teach him what to do in the team through his own skills, so in this way is easier to integrate in the team and get used with the working style of the existing members.
6. If there is need for working force in the team, the foreman calls to the office and gets a stash of CV's, which he has to choose from.
7. Age for example, in the team he has people from 18-45 years or 45+, and he is choosing depending on the role that needs to be filled up. The skills are not as important as the capacity to learn or to be open.
8. Only Danish speakers.
9. No internationals.
10. Yes. If they are not motivated, you can see and feel it in the way they work, which is affecting the team's performance. The foreman has to motivate them and provide a good environment due to the fact that they work together for many hours and if it a stressful environment, no one can work on its full potential, getting the performance of the team lower. He compares the team with a marriage. If all the members are happy, they trust and rely on each other, the collaboration between them is going good and this reflects on their results.
11. + 14. A new project will be available on the tablet from two weeks or sometimes even only two days before the project start. The foreman has to be present at the new working site one- two days prior to the project start, in order to asses and get to know the site and make a working plan for the next day when his team is coming and have to start the work. In the morning of a first day at a new site, the foreman has a meeting with his team and everyone gets to know what each one of them have to do.

- 12. They know each other outside the work, and go sometimes together out in the town.
- 13. -
- 14. -
- 15. -
- 16. –

17. If there is an obstacle or anything that the foreman really needs, he goes to his supervisor and talks to him.

18. Team as a family; communication; new machinery.

19. Yes

20. He tells them open whenever is anything to say.

21. Yes. Open as a family. Is the way it is

22. Yes.

Extra: are the members communicating in breaks? In the breaks every member has its own time, away from the stress from work. The foreman is not exercising his role in the break. He also says that the members feel motivated to come at work when there is a good environment to come to, and when you have to work with a team that you get along with. Due to the fact that with the new season, a number of teams did not get any project, the workers were distributed along the other teams. So even if the foreman would have need someone new in his team, he won't hire someone new, because he has to take some of the men that are already hires in colas, but have nothing to work with their own teams.

Foreman 2

1. Six people in total in the team, including the foreman.
2. Everyone has specific roles that they do every day, e.g. some of them are on machines, and others have to level the asphalt. But that doesn't mean that if one is missing the work stops. Every job has at least two, three people that can perform it, in order to ensure the flow of the activities, even if someone is not present at work, but also if there is need for help.
3. One Romanian and the rest are Danish.
4. No
5. It is good if the new worker has some experience from the school in the asphalt industry, but most of the times the worker need to be taught on the way. The foreman says that he did not hire that many workers, as the majority of his team started to work in the same time in the team.
6. If there is need for working force in the team, the foreman calls to the office and gets a stash of CV's, which he has to choose from, but also, and it was stated that this is most of the time, the hiring is based on personal knowledge and network.
7. -
8. Only three of the team members speak English in the team, including the international member, and the Romanian man does not speak Danish, but understands at a certain point. This makes the communication a little bit harder in total, but it was presented as no problem to the performance or result of the work of the team.
9. The break is more for relaxation and eating, but of course communication happens during breaks. The fact that the Romanian worker does not speak Danish makes the communication possible only with the two other members that know English.
10. The foreman says that the workers feel motivated to come at work, especially the old team members which know each other. The question comes with the new comer, which may be a little bit stressed by the fact that is a lot of pressure on him to start taking other roles in the team than the only one that he is doing at the moment.
11. + 14. The plan for a new job comes in the tablet software sometimes from day to day, even if it should be planned with a week forward. All the members get information about the new work and everyone knows what they have to do.
12. The team is not usually going out together to spend time or connect bonds with each other. The foreman and the international member are playing football at the same team, and two of the Danish members live in the same city, fact that makes them

spending more time together. But no other external team activities. Back in time, when the company was offering their financial support, the team was gathering two times a year at the foreman's home, have some dinner and some drinks. But as colas stopped financing these gatherings, some of the members are not interested in paying in order to get to spend more time with each other. The foreman is aware of the importance of team bonding outside the work.

13. Conflicts sometimes occur. Most of the time when the foreman is not present at the site. When the foreman is not present at the site, a "second to chair" man takes his place as a coordinator of the team. But sometimes he is not the best person to solve a problem and conflicts may arise, and so, when the foreman comes again at work has problems to solve, in order to have everyone happy and keep on working as productive as they can.
15. Making the new member working in different roles.
17. No
18. Good and open communication. Experience together.
19. Yes. The team is efficient. Is hard to compare to other teams, as every team has different projects, different size and complexity.
20. + 21. Yes. It is important to let them know. Positive feedback comes in a special day only, due to the fact that the good work should be achieved every day. But the constructive feedback is offered whenever is needed, in order to improve as a team and get better result all the time.
22. Yes. Everyone is making mistakes sometimes, but if they do the best they can, that is perfect. When all goes good with the work, the foreman takes pride. When something goes wrong, he takes time into thinking what went wrong, what was the reason, how can it be fixed, how can it be stopped of happening again.

Extra:

- Due to the fact that with the new season, a number of teams did not get any project, the workers were distributed along the other teams. So even if the foreman would have need someone new in his team, he won't hire someone new, because he has to take some of the men that are already hires in colas, but have nothing to work with their own teams. In the beginning, the foreman was happy to hear that he will have a new member with experience in his team, as he needed one more man in the team, but the new member is only working in one role, and he is not willing to learn to do something else in the team due to his age. This is one sign of weakness in the team.
- No meetings with the team to talk about problems or issues, if anyone has anything to say, they say it openly, at the moment it happens. Also, if the foreman see that someone might have some problem from the way he acts, he tries to solve the problem if it is work related, or if he can really help e.g. if it is a healthy issue and the worker need a day off to recover.

7.2. The team questionnaires sample

Crew questionnaire

In black text you will find the questions in English. *I rød tekst finder du spørgsmålene i dansk.*

Feel free to answer in which language suits you better. *Du er velkommen til at svare på hvilket sprog der passer dig bedre.*

The questionnaire is anonymous. *Spørgeskemaet er anonymt.*

1. When did you start working in Colas? *Hvornår begyndte du at arbejde i Colas?*

2. Did you have any previous experience in the field? *Har du haft nogen tidligere erfaring?*

3. Did you have any professional training in Colas when you started? *Har du haft nogen faglig uddannelse i Colas, da du startede?*

4. Do you communicate with your team members when you have a work related problem or do you try to solve it by yourself? *Har du kommunikeret med dine teammedlemmer når du har haft et arbejdsrelateret problem eller har du prøvet at løse det selv?*

5. Do you have non-Danish colleagues? Are you communicating? What language do you use? *Har du udenlandske kollegaer? Kommunikerer I? Hvilket sprog bruger I?*

6. Do you communicate with your colleagues in breaks? *Taler du med dine kollegaer i pauserne?*

7. Do you share general information (like tv news) or ideas during breaks? *Deler du generelle oplysninger (som TV nyheder) eller ideer i pauserne?*

8. Do you have external team activities with your colleagues? (team building) *Har du eksterne holdaktiviteter med dine kollegaer? (teambuilding)*

9. Do you know each other outside work? *Kender I hinanden uden for arbejde?*

10. Are you an efficient team? *Er I et effektivt team?*

11. What are the strengths and weaknesses of your team? *Hvad er de stærke og svage sider af dit team?*

12. Do you ask for help when you need it or do you consider it is a sign of weakness if you can't figure something on your own? *Har du bedt om hjælp, når du har brug for det eller mener du det er et tegn på svaghed, hvis du ikke kan finde ud af det på egen hånd?*

13. Do you feel accepted, a part of a team? *Føler du dig accepteret, en del af et team?*

14. What is your age? *Hvad er din alder?*

15. Do you feel that you have communication problems in your team? Can you give an example? *Føler du, at du har kommunikationsproblemer i dit team? Kan du give et eksempel?*

16. Give a grade from 1 to 5 to the following statements, where 1 = agree and 5 = disagree

Giv en karakter fra 1 til 5 til følgende udsagn, hvor 1 = enige og 5 = uenige

- You and your team members have common target and values regarding the working process

Du og dine teammedlemmer har fælles mål og værdier vedrørende arbejdsprocessen

- You comply with working discipline inside the team. (hierarchy, rules, respect)

Du overholder arbejdsdisciplinen inde i teamet. (Hierarki, regler, respekt)

- You have the ability to carry out the working process. (don't need assistance to get the work done)

Du har evnen til at gennemføre arbejdsprocessen. (Behøver ikke hjælp til at få arbejdet udført)

- You are working together with the team members towards fulfilling the assigned work.

Du arbejder sammen med teammedlemmer i retning af at opfylde den tildelte arbejde.

- You feel reward in your own work.

Du føler belønning i dit eget arbejde.

- You feel reward in the team's good performance.

Du føler belønning i holdets gode resultater.

17. Give a grade from 1 to 5, where 1 = often, and 5 = rarely
Giv en karakter fra 1 til 5, hvor 1 = tit, og 5 = sjældent

- Respect / *Respekt* ☐
- Help / *Hjælp* ☐
- Conflicts / *Konflikter* ☐
- Confidence (trust) / *Tillid* ☐
- Discrimination / *Diskrimination* ☐
- Good environment / *God miljø* ☐
- Equality / *Ligestilling* ☐
- Communication / *Kommunikation* ☐
- Satisfaction / *Tilfredshed* ☐
- Appreciation / *Vurdering* ☐
- Criticism / *Kritik* ☐

Any Comments/ Suggestions: (*Optional)

*Kommentarer / Forslag: (*Valgfrit)*
