

Extension of Group Leader Office information system to indirect manpower in TPCA Czech s.r.o.

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Office na nepřímá pracoviště ve firmě TPCA s.r.o.**

Zásady pro vypracování:

Úvod

I. Teoretická část

- Zpracujte rešerši o teorii informačních systémů se zaměřením především na problematiku zavádění informačního systému do činnosti podniku a překonávání problémů ze strany koncových uživatelů.

II. Praktická část

- Zpracujte analýzu současného stavu po zavedení informačního systému s ohledem na plánované rozšíření systému na nevýrobní celky firmy TPCA s.r.o.
- Analyzujte současný stav administrativních činností offline group leaderů se zaměřením na činnosti, které aktuální funkce systému vykonávají.
- Vytvořte konkrétní požadavky na rozšíření informačního systému na základě předchozí analýzy.
- Sjednoťte a specifikujte požadavky do zadání pro dodavatelskou firmu.

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[2] LIKER, J. K. Tak to dělá Toyota: 14 zásad řízení největšího světového výrobce. Vyd. 1. Praha: Management Press, 2007. 390 s. ISBN 978-80-7261-173-7.
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ABSTRAKT

Účelem této práce je vytvořit zadání pro rozšíření informačního systému Group Leader Office na nevýrobní sekce firmy TPCA Czech s.r.o. Toto zadání je vytvořeno na základě analýzy administrativních procesů v nevýrobních sekcích firmy, především v rámci údržby a offline support týmů. Zadání pro rozšíření system tvoří projektovou část práce a popisuje jednotlivé změny, které budou do systému začleněny, aby mohl být efektivně využíván nepřímými pracovníky v TPCA Czech s.r.o.

Klíčová slova:

Informační systém, rozšíření IS, řízení nepřímých pracovníků, administrativní systém, IS projekt

ABSTRACT

The purpose of this diploma thesis is to elaborate a submission for extension of Group Leader Office information system to indirect manpower in the TPCA Czech s.r.o. This submission is elaborated on conduction of analysis of administrative processes in the indirect sections of the company, in particularly maintenance and offline teams. The submission for the system extension embodies the project part of this work and describes individual changes that will be amended to the system in order to be effectively used by indirect manpower in TPCA Czech s.r.o.

Keywords:

Information system, extension, management of indirect manpower, administrative system, IS project

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“I never see what has been done; I only see what remains to be done. “ - Buddha

I hereby declare that the print version of my Master's thesis and the electronic version of my thesis deposited in the IS/STAG system are identical.

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INTRODUCTION

This thesis is an outcome of an internship in the company TPCA Czech s.r.o. that the author has undertaken since September 2010. Its purpose is to develop a detailed submission for the supplier to extend current information system Group Leader Office.

In the theoretical part the author will review various literature sources regarding information systems. The author will focus on the issues of IS project development and subsequently the issue of user resistance which is to be expected once the development of the IS project is finished. Theoretical part of this thesis provides informational background to the analysis and project part.

The purpose of the analytical part of this thesis is to map administrative processes of the future system users. The extension of GLO is focused on the indirect manpower in TPCA. Indirect manpower is represented by maintenance workers and support offline teams. Office workers are not a target of the extension thus the system was designed for Group leaders in the company. The output of the analysis will be a consolidated overview of administrative processes. Based on this output it will be decided which modules of GLO will be modified in order to suit the future users. Furthermore, the analysis will cover basic functionality mapping of selected modules in GLO.

The project part of this thesis concentrates on the modification and new features to the system in order to make the system applicable for indirect users. The project serves as a submission of the project extension for the supplier who will be based on the requirements stated in the submission develop the system in order to be used efficiently by both direct and indirect manpower in TPCA. When necessary the submission will be complemented by visual examples and proposal to the new or current functionalities. Individual new features and modification will be described based on their functionalities and the way they will affect the system. The submission for the initial development of the system for the direct manpower was created by the supplier and thus created additional costs to the system development. The submission is created by in-house resources and carefully consulted with all parties involved in the process. The submission takes strong learning point from the first system development and its goal is to clear and detailed specification of requirements of the future users in order to avoid redundancies in the system as occasionally happened after the implementation of the first version of the GLO. The submission will also state expected

benefits from the extension. Nevertheless, it is expected the most of the benefits will be of intangible manner due to the fact that the system will be designed to facilitate administrative processes and not to reduce the actual manpower in the company.

The project part of this thesis is constitutes the submission for the system extension according to which the supplier will develop and amend the system. Due to the limited size of this thesis some parts of the submission will be retrenched by surplus information.

I. THEORY

1 INFORMATION SYSTEMS

An information system (IS) is a system for intake of data/information as an unprocessed material and during one or more transmutation processes, generating information as an output. In general, information systems perform several functions within a business and its environment. Key functions of an information system are following:

- *perception* – primary establishment of data both generated or obtained by the organization
- *recording* – material gain of data
- *processing* – conversion of data according to the required outcome of the organization
- *transmission* – the stream of data flow in the IS
- *storage* – protection of historical data for future purposes
- *recovery* – exploration of the system for recorded data
- *presentation* – reporting, communication, outputs of the data in printable form
- *decision making* – a divisive addition, except to the extent that the IS involves in decision making regarding itself.

The inclusion of the last item of the functionality of information system may seem as an instance for objections by some critics. Nevertheless, it has to be taken in consideration that users of information system not only work with the system on form of confrontation with information. The system itself is required for timely and relevant decision making. Its main purpose is to serve its users [1]. The basic term that covers the whole area of enterprise information systems is ERP (Enterprise Resource Planning). Although some researchers assign the term ERP only to single part of all large organization-wide packaged applications and use the term Enterprise system as a unifying term for all types of information systems [51]. This thesis will use the term ERP as the merging signification among information systems. ERP is a term for such an information system that can covers business processes of planning and decision making on all levels of the company from top management to operational level. ERP systems can be further divided into several types:

- MIS – Management information systems

- SCM – Supply Chain Management information systems
- APS – Advanced Planning Systems
- CRM – Customer Relationship Management information systems

These basic types of information systems can be designed as an individual information system or as a module of one more complex information system. [52]

1.1 Management information systems

The author of this thesis will focus in this chapter on the further description of the Management information system due to the fact that the Group Leader Office information system can be best classed into this type of information systems. The system itself will be further described in the chapter 3. Systems that are designed to facilitate the decision making process are referred as Management Information Systems (MIS) and it is defined by Davis and Olson (1984) as following: “*An MIS is an integrated, user-machine system for providing information to support operations management and decision making functions in an organization.* [11]” Management information systems are a combination of hardware and software used to process information automatically. Commonly, MIS are used within organizations to allow many individuals to access and modify information. In most situations, the management information system mainly operates behind the scenes, and the users are infrequently involved or even aware of the processes that are handled by the IS. A computer system used to process commands and operations for a business could be considered a management information system because it is assisting users in automating processes related to commands. Other examples of modern management information systems are websites that process transactions for an organization or those that provide support requests to users. A straightforward example of a management information system might be the support website for a product, because it automatically returns information to the end user after certain primary input is provided. Management information systems typically have their own personnel whose function it is to maintain active systems and implement recent technologies within a corporation. These positions are often highly specialized, allowing a team of people to focus on different areas within the computer system. In recent years, colleges and universities have begun offering complete programs dedicated to management information systems. In these programs, students gain knowledge

of how to manage large interrelated computer systems and facilitate the automation of these management information systems [48].

1.2 IS Resources

The resource-based view argues that companies own resources, a subset of which provides them with possibilities to realize competitive advantage, and a further subset which may turn in the future to superior long-term performance [4]. Resources that present a value to the company and are difficult to obtain by others and whose profit can be appropriated by the owning (or controlling) company provide it with a short-term competitive advantage. That advantage can be maintained through time to the level when the firm has the capacity to protect against resource imitation, change, or substitution [37].

IS resources that represent the capabilities in possession of a firm can be divided into three types: inside-out, outside-in, and spanning. Inside-out capabilities take effect from inside the company in reply to market requirements and opportunities, and are likely to be internally determined (e.g., technology development, cost management). In contrast, outside-in capabilities are externally focused, with an importance on anticipating market requirements, establishing long-lasting customer relationships, and analysing competitors (e.g., market sensitivity, managing external relationships). Finally, spanning capabilities, which entail both internal and external analysis, are needed to join together the company's inside-out and outside-in capabilities (e.g., IS management/business alliances, IS development and planning) [12].

1.2.1 Outside-in capabilities

External relationship management represents the company's capability to handle threads between the IS function and stakeholders outside the firm. It can be perceived as an ability to work with suppliers in order to develop suitable systems and infrastructure needs for the firm, to deal with relationships with outsourcing partners [14], or to manage customer relationships by offering and realizing solutions, maintenance, and client service [7]. Many large IS departments rely on outside partners for a important piece of their field of business.

Market sensitivity compounds both the gathering of information from outside sources as well as the company's research activity on the market and its ability to learn [12]. It

combines the capabilities to develop and manage projects quickly [57] and to respond promptly to alternations in market circumstances. Bhardawaj adds: “A *key aspect of market responsiveness is strategic flexibility, which allows the organization to undertake strategic change when necessary* [7]”.

1.2.2 Spinning resources

IS-business partnerships is defined by the processes of integration and conformity between the IS function and other functional spheres or sections of the firm. The significance of IS conformity, mainly with business strategy, has been acknowledged [42]. This resource has been referred to as synergy [23], integration [3], and partnership [42]. The importance of relationships establishment on internal basis within the company between the IS function and other areas or departments has been widely recognized.

IS planning and change management are defined by the company’s ability to plan, control, and employ suitable technology design and standards. Essential aspects of this resource consist of the ability to predict future changes and development, to pick platforms (including hardware, network, and software standards) that can provide this change [42], and to successfully manage the consequential technology alteration and growth [36]. This resource has been defined as acceptance of the business case, problem solving direction [42], and ability to handle IT change [6]. The ability of IS managers to understand how technologies can and should be used is an inseparable part of this resource together with the ability to encourage and lead IS staff through the change process [42].

1.2.3 Inside-out resources

Many mechanisms of IS infrastructure (hardware and software) express no specific strategic benefit due to lack of scarcity, no difficulty of imitation, and possibilities of mobility [46]. Therefore, the types of IS infrastructure mentioned in the recent studies are either owned by the company, compound and hard to duplicate [6]. In spite of these attempts to concentrate on the non-imitable perceptive point of IS infrastructure, the IS infrastructure resource has usually not been considered to be a basis of sustained competitive advantage for companies [36].

IS technical skills are an effect of the suitable, modernized technology skills, relating to both systems hardware and software, that are in possession of the IS/IT employees of a firm

[46]. According to Bhardawaj “*such skills do not include only current technical knowledge, but also the ability to deploy, use, and manage that knowledge. Thus, this resource is focused on technical skills that are advanced, complex, and, therefore, difficult to imitate. Although the relative mobility of IS/IT personnel tends to be high, some IS skills cannot be easily transferred, such as corporate-level knowledge assets [7]*” and technology combination abilities [14], and, thus, these resources can be comprehend as a basis of sustained competitive advantage.

IS development refers to the ability to build up or conduct a research with new technologies [23], as well as a broad level of awareness to rising technologies and tendencies that allow a company to rapidly take advantage of new conveniences [58]. Therefore, IS development should be understood as future-oriented.

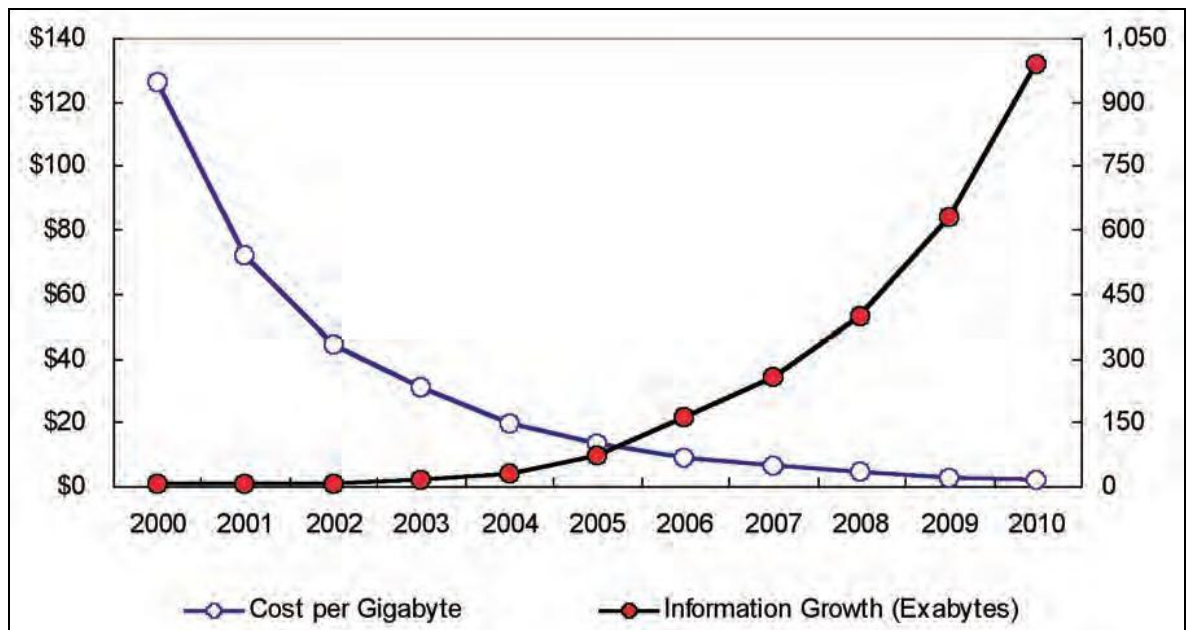
Cost effective IS operations as a resource includes the capacity to provide professional and cost-effective IS operations on a continuing foundation. Companies with superior effectiveness can develop a long-term competitive advantage by means of this ability to decrease costs and gain a cost leadership position in their business [40]. In the framework of IS operations, the ability to avoid cost overruns, redundant downtime, and system failure is expected to be a significant predecessor to higher performance [46]. Additionally, the capacity to develop and manage IT systems of fitting quality that work in effective manner should have a helpful impact on performance [7].

1.3 Development of Information systems

Worldwide investment in IS has been widespread. According to AMR Research, such investment in IS was U.S. \$36 billion in 2004 [43]. Concentrating just on ERP, Gartner suggested that the worldwide ERP software market was U.S. \$24 billion in 2008. With the top five vendors in market share were SAP (28%), Oracle (14%), Sage (7%), Infor (6%) and Microsoft (4%) [20]. Companies have also spent millions of dollars acquiring and implementing IS; for example, Disney Corporation reported at a presentation at SAP’s annual user conference, Sapphire 2003, that it spent \$400 million on its two-year SAP IS consolidation project. The Sapphire conferences are a series of annual conferences organized by SAP, the world’s largest vendor of enterprise systems. Sapphire conferences provide a tool for SAP to notify their customers of latest product. At a typical 3-day U.S. Sapphire conference, there are usually over 10,000 attendees, many paying some thousands

of dollars each to attend [51]. Practitioners' interest in IS (specifically, ERP) peaked in 1999 then fell markedly by 2003, attendance at SAP's U.S. Sapphire conferences rose to 15,000 in 1998, dropped to 7,000 in 2003, then rose steadily to 15,000 in 2008 before dropping to 10,000 in 2009 [41]. However, as with most large IT projects, not all IS projects go smoothly. Widely reported disasters include the FoxMeyer Drug company, a U.S. \$5 billion per annum revenue pharmaceutical company that went bankrupt and sued SAP and Andersen Consulting for U.S. \$500 million after its failed SAP implementation [50], and Hershey's, an American \$4 billion per annum revenue confectionary maker, that spent \$112 million dollars for the implementation of the SAP system, and which lost \$150 million dollars in revenue as a result of logistics problems in the first year [9].

One of the major factor of IS investment is the need of the data-storage database systems. Over the past decade, the mountains of data accumulating within firms – expanding at an annual rate of 30-50% and stimulated also by recent legislation such as SEC Rule 17a-4 mandating the retention of electronic communications (e.g. email and instant messaging) in financial services firms for periods of up to three years – has forced information technology managers to elaborate on the way how data deluge should be managed. Intel, whose data warehouse is currently estimated at over 30 petabytes has enlarged its data storage by an average of 35% every year with the expectation that its data centre might expand to 165 petabytes by 2014. Yet even as data volumes climb, causing data centres to double in size every two years, an innovation-led drop in annual per-gigabyte storage costs of 35- 45% (see Picture 1) has failed to stop the progress in storage spending [9].



Picture 1 Information growth and storage costs [9]

The development of the information system that will provide the organization and the user's benefits from implementation depends on several key factors both short-term and long-term. Such development that is mostly done through IS project will be described in the next chapter.

2 IS PROJECT

This chapter provides an overview of the issues of project management of information systems. After a brief definition of project management the chapter will continue on the issue of proper strategy selection and project team together with the duties of a project manager.

2.1 Project management

First, the author of this paper will briefly describe the fundamentals of the Project management discipline. Project management is a specific managerial activity that is focused on successful leadership and management of a project. Project is defined as temporary task with a clearly specified goal. Realization of the goal requires organized utilization of relevant resources. Each project can be described using four typical features: three-dimensional goal, uniqueness, resources involvement and cooperation with the common organization. Project management is a process that is focused on the fulfilment of the set goals of the project in any organizational structure without the influence of the contradictory forces. Therefore, such a process requires constant conviction of others about the importance of the project. Project management includes five key managerial activities: defining, planning, leadership, monitoring and finishing. Project is defined by the three-dimensional goal. Controlling all three dimensions is crucial for successful fulfilment of the project. Those three dimensions are: definition of the project in the project submission, timetable of the project and project costs.

Although each project is specific the theory of project management offers every manager various methods and instruments. Utilization of these methods and instruments is mostly universal regardless of the nature of the project. One of the most fundamental issues of the project management for the manager is to fully adopt these methods and instruments and use them appropriately with the relevance of the project nature and specification. The proper selection of these methods can significantly facilitate the project while choosing inadequate method might result in causing more work than necessary [45].

2.2 IS projects development

The success of system development is most often measured by three main indicators: The delay of the set schedule day, the difference from the planned budget, and fulfilment of requirements of the final users [19]. Tools and techniques to facilitate this scope differ in practice and research. However, the project view in this field should be broader than any particular development tool or methodology. All appropriate measures can be inserted into a systems development project to best fit the conditions. In order to satisfy the three criteria, system development project managers have to focus on the process of task achievement and manage to apply control tools that ensure success, support learning within the team and organization, and conclude with a software that not only meets the requirements of the future users but functions efficiently and is flexible enough to be modified in order to meet changing needs of the organization. In this manner, the project scope must examine both process and product [53].

It is vital to understand the point of view of success criteria from other stakeholders. Understanding how different stakeholders recognize these factors influent final project success is important in adjusting suitable methodologies.

2.2.1 IS strategy selection

In order to understand the target of an IS project within the company it is advisable to subject the IS project to an analysis and discussion of how the project fits in the company's profile and strategy in order to be generally understood and acknowledged by all departments within the organization. Lambert in his work developed a portfolio of four categories of information system projects:

- *Strategic*: Projects providing a crucial strategic advantage.
- *Operational*: Projects for common operations with IS spin-offs.
- *High potential*: Projects exploring new technologies and approaches.
- *Support*: Projects providing essential support to various activities. [39]

The idea is to classify every project and fit it into one of these major categories. This categorization of projects is difficult because many partly cover a number of portfolio groups. According to Leek this can be perceived as a positive thing because: “*It provokes*

discussion by the portfolio steering group on the exact role of the project. Often projects are put forward with a simple title and a presumed focus. On discussing the placement of the project in the portfolio the focus can often change and prove more useful. The portfolio approach triggers this discussion. [27]” The discussion can reveal several hidden information about current system in the company and prove it to be insufficient to advanced needs of the company.

Portfolio groupings should be selected with relation to the market, operational situation, tactical objectives, etc. of the particular organization. The purpose of categorizing projects has more benefits than just the start of discussion of the nature and purpose of proposed projects. It can also provide a careful outline to examine and monitor an overview of the employment of resources and easily incorporates the continuing development rank of projects in the portfolio. A main advantage can also be drawn by the project setting the key performance indicators related to each portfolio area [27].

2.2.2 Project team

Projects are achieved by teams, where a project team is a group of individuals responsible for carrying out the project work. The project team is bound with the project manager, or leader, for the length of the IS development. Persons on the team typically bring different know-how, priorities, work habits and standards to a project. *“While there are obvious challenges to the project management type of organization, researchers and practitioners report that IS managers utilize this form of structure in their organizations extensively because this approach has been successfully used to organize the development of new software and hardware projects while satisfying customer needs”* clarifies Markus in his work [34].

Members of project teams usually work in different positions within the company hierarchy. The resident of each position is expected to perform certain functions to achieve their teams' goals. To be exact, responsibilities are different according to the position [17]. The role of project manager will be examined in the next chapter.

Project leader often needs to plan project progress, understand users' data/information requirements, and assess new systems aligned with user requirements [17]. System analysts are commonly involved in development and design of the system, writing program documentation, conducting discussion with users and supporting system operation [28].

The study conducted by Jiang in 1997 suggests that IS professionals agreed on the relative importance of the criteria that determine the success of the IS. They clearly agreed that the most important is the quality of work the IS project team (this criteria ranked 1st in the study) and that the least important criteria of success are loyalty to budget and the amount of work a team (ranked at the bottom of the study results). The agreement on rankings suggests that IS professionals share values. This has implications for group and organizational functioning because shared values should ease communication among these groups, and consequently help in the co-ordination of their activities [24].

2.2.3 Project manager

One of the most crucial decisions in project management is selecting a project manager or team leader. The project manager is usually assigned to the project at the first stages of the project life cycle, but a new one may be brought in as replacement in the later stages of a project. The project manager must play many roles. First, the project manager must play an executive role that focuses on planning, organizing, and controlling. The project manager must also perform many administrative functions, including performance evaluation, project follow-up and reporting, and other common everyday responsibilities.

The success of the project does not depend solely on the project team, but also on the contributions and support of all project stakeholders. Therefore, the project manager must build and look after the relationships among the various stakeholders. The project manager must play a strong leadership role. While the managerial role focuses on planning, organizing, and controlling, leadership centres on getting people motivated and then focused on the right path towards a common goal. Choosing a project manager for a project is equivalent to hiring an employee. It is important to look at his or her background, knowledge, skills, and general strengths and weaknesses.

Key attributes of a successful project manager include:

- *The ability to communicate with people* - A project manager must have strong communication skills. A project manager does not have to be a powerful motivational speaker, but should have the talent to connect with people, share a common vision, and get every person in the team to contribute or head in the right direction.

- *The ability to deal with people* - Aside from being a good communicator, a project manager must have the soft skills for dealing with people, their egos, and their agendas. This skill allows the project manager to get below the surface of issues when people are not being completely honest or open without being annoying or alienating them. A project manager must also have a sense of humour. Often, project managers and project teams are expected to perform during tense situations, and a sense of humour can make these situations more controllable. A project manager does not have to be everyone's best friend but people should feel that they are at least approachable and should be comfortable talking with him or her.
- *The ability to create and sustain relationships* – A project manager should perform the role of peacemaker or negotiator among the project client or sponsor, top management, the project team, customers, suppliers, vendors, subcontractors, and so forth may be necessary. An effective project manager must continually sell the value of the project to all of the stakeholders and influence others over whom the project manager has no direct authority.
- *The ability to organize* - A project manager need to perform well at organizing, developing the project plan, acquiring resources, and creating an effective project environment. The project manager must know and understand both the details and the big picture, which requires an acquaintance with the details of the project plan and also an understanding of how possible contingencies may influence the plan [38].

3 INFORMATION SYSTEMS SUBMISSION AND IMPLEMENTATION

In the implementation of the IS project the realization stage is often the limelight, the realization stage includes the installation and setup of the application, while other stages usually stay behind the prime focus. When a company is asked to define future requirements from the information system it is not uncommon for the company to lower to generalizations and underestimation of the future requirements. This approach leads only to the situation that in the next phase of proper application selection excessive amount of systems that fulfil wide range of functionality. As a result the price of the system gets inappropriately high and the selection itself is divided into several rounds of selection procedure within weeks and months. Furthermore, the residue of the uncertainty whether the best fitting system was selected stays within managers or key workers for the selection is made.

Initial phase of the process is one of the most important and the final choice of the product depends on it. This phase gives the management of the company the scope to categorize their requirements and expectations of the tasks that the information system should cover.

Important step is to select the responsible person for the submission development (the project manager) and the project team selection. The role of the project manager was described in the previous chapter and in case that the project manager is a vendor, the creation of the management communication channels are vital. The selection of the project team depends on the scope of processes and tasks that future system will provide. For every area/process the company should define key worker (a sponsor) who is then responsible for definition of the requirements and ensuring sufficient communication within the company. Effective team should not exceed 10 workers [5].

Rek in his article about submission creation pointed out several key difficulties that a team may encounter and relevant counter measures:

- Submission creation needs to be given enough time
- Management must be involved in the submission creation and clearly state their requirements to the system

- The system will not exist in “blank space”, it has to be incorporated into the company’s environment

In case of the reengineering of the system the requirements on the functionalities must be considered. The argument “it is already in the system” is not sufficient

- Finalization and correction to the requirement is advised. Most of the IS are used only at 30-50% out of the full capabilities. Unused functionalities might cost considerable amount of money
- Statement of benefits should be a part of the submission

Missing out several areas whose representatives are not included in the project team is a common problem which leads to the situation that these “forgotten” requirements are being considered further in the stage of actual implementation including all subsequent complications. One of them is often management requirements regarding reporting. The management conception towards future report from the system needs to be taken into consideration in the submission creation stage. Analytical and statistical reports are the most common version of such requirements. When such demands are taken into consideration from the beginning it is “easier” to set up proper data structure and automatize all reports as good as possible. Otherwise, further requirements will represent excessive manual alternation of the outputs from the system and the affectivity of system usage will decrease significantly [44].

Another section which is often excluded or dealt with only marginally within initial discussions is IT problematic itself. In most cases this issue is solved by determination of basic technical requirements for the system operation – server issue, HW requirements, type and version of database server, operation system at workstations. Nevertheless, it is also vital to consider implementation of the information system to the infrastructure of the company. It is important to consider how will be current systems connected the new IS and how will be data interface modified or extended. The submission should include description of current SW applications (type and version of office SW). In many projects the neglect of such information often results in additional investments into the alternation of this kind of software assets in the company.

The sponsors for relevant areas in the submission creation stage are responsible for data collection in their field of activity and communication inside the company. Their main task

is however creation and summarization of requirements on the system. Determination of the priorities of the functionalities and benefits is of high importance of their role within the project. A brief description of activities and requested outputs should be also a part of the submission. [5]

The end of this initial phase is the creation of the final version of the submission. For this activity it is essential to ensure participation of the management of the company that will together with the project manager and sponsors go over the document and summarized requirements. The goal is to maintain reasonable amount of requirements and consider the complex functionality of the system (necessary vs. nice to have). It is not uncommon that company pays for the functionality that is at the end barely used by the end users or generates outputs that are stored in the “drawer”. The management participation is convenient for several reasons. First, the management gains clear understanding of the requirements of the company for the system and the management gets to issue clear statement towards them. Second, management can make the decision that a sponsor was not able to make due to the limited competence of the sponsor. Last but not least, the management participation in the submission creation gives clear statement of the importance of the project and creates healthy conditions for further realization of the project. [44]

Implementation of the information system relies on definition and linkage of new information system to company procedures. At the same time changes evoked by the new IS in company's processes and structure are implemented. After these activities the new IS is becoming usable, however the period of trials and optimization imminent.

During optimization of the information system inspections are taken regularly to determine if the system supports company procedures in the most suitable way. New circumstances may appear that will require harmonization of the system within company procedures or to extend the functions of the system. Understanding processes both in the system and outside is crucial for functionality harmonization of the system within the company. As a consequence of this approach the changes within implementation are advancing, identifying imperfections and failures of the implemented changes [18].

4 USER RESISTANCE

User resistance in IS research has been defined as an unfavourable reaction [21] or the disagreement of users to supposed change connected with a new IS implementation [34].

Human behaviour (e.g., recognition of benefits from use of IS) is steered according to Ajzen by three kinds of thoughts: “*behavioural beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes; normative beliefs about the normative expectations of others and motivation to comply with these expectations; and control beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors* [2].”

Resistance ought to be expected from the beginning of the project. Rumours and gossip will influence the users, and the change effort can soon be weakened when people affected by the change begin to resist. Resistance can be obvious, in the form of emails, discussions, etc., or hidden, in the form of disruption, politicking, etc. Once the change is weakened, management and the project team might suffer from loss of authority, and the organization may become opposing to all future changes [32].

Among the theoretical explanations, Markus [34] explains user resistance as an interaction between system characteristics and the social background of its application. The interaction is mostly visible in the change in inner authority distribution with the new system, in case of loss of power the resistance is expected by the affected group of users. Resistance behaviour can be clarified as a reaction to intimidation that a person links with a new system [39]. Persons make a fundamental attribution of a new IS based on inner and outer influences. The attribution then leads to efficiency expectancies of which pessimistic expectancies lead to user resistance [35]. In recent studies, Lapointe and Rivard have proposed a process model of opposition to IS implementation founded on the five dimensions of preliminary conditions, relations, threats, and performance, with respect to the subject and object of resistance. First conditions deal with the object of resistance (e.g., system components) to build up a perception of threats (e.g., decreasing responsibilities) that establish resistance behaviour [26]. Consequently, genuine understanding of the system outcomes and external starters enhance the following level of interactions and behaviours [51].

4.1 Status quo bias theory

Status quo bias theory tries to explain people's inclination for keeping their current position or situation. Samuelson and Zeckhauser in their study express status quo bias rationalization in three main categories: rational decision making, cognitive misperceptions, and psychological commitment [47].

4.1.1 Rational decision making

This category entails an evaluation of comparative costs and benefits of change before moving towards a new option. Higher costs than benefits result in status quo bias. From the rational decision making perspective, two types of costs are recognized: shift costs and insecurity costs. *Shift costs* are the costs resulted from conversion to the new situation. Subtypes of shift costs can be divided into different temporary costs that take place during the change and stable costs that are an outcome of the change. Temporary costs consist of the costs of adaptation to the system and stable costs which include the loss of work based on the new IS. *Insecurity costs* are represented by the psychological uncertainty or perception of threat posed by the new alternative and they can also be the reason for status quo bias. Change in the company based on the implementation of new IS can bring along insecurity costs on users because they may be uncertain and concerned about the resulting changes [47].

4.1.2 The cognitive misperception

The cognitive misperception of loss aversion also clarifies the reason of status quo bias. Loss aversion is a psychological principle that has been studied in human decision making in that losses are perceived larger than benefits in value reception. Loss aversion may cause the status quo bias because even small losses based on the change from the present situation might be understood as larger than they actually are [25].

4.1.3 Psychological commitment

The third category of status quo bias rationalization relate to psychological commitment. Three key elements contribute to psychological commitment: sunk cost, common standards, and aspiration to feel in control. Sunk costs are based on earlier commitments, which inflict unwillingness to change to a new alternative. These costs contain skills

connected to the previous way of working, which will be valueless as a result of change to the new IS. Common standards are based on the habits established in the work environment with contrast to the change, which can either strengthen or weaken an individual's status quo bias. Aspiration to feel in control originates from individuals' wishes to direct or decide on their own situation [47]. This desire can cause status quo bias because people would like keep control that is lost by switching to an unfamiliar system or different way of working. Common standards and controls in status quo bias theory are comparable to normative and control beliefs respectively [2].

4.2 Resistance reasons

Resistance can arise for many legitimate reasons. For example, someone may resist an information system because the response time is too slow or because it does not provide the features or functionality that was in the beginning specified as part of the requirements. On the other hand, resistance due to cultural or behavioural reasons is more difficult to explain, but still can keep a project from reaching its intentional purpose. People may resist change even though they understand that the change will be beneficial [10].

There are some examples why resistance occurs:

- Some people feel that the change is requiring more time and energy than they are willing to invest.
- Sometimes people feel that that a change will represent giving up something that is familiar, comfortable, and predictable.
- People might be irritated with the interference caused by the change, even if they know that it will be helpful in the long run.
- People might believe that the change is being imposed on them from the outside, and their egos will not accept being told what to do.
- In addition, people may resist because of the way the decision to change was announced or because it was forced upon them.

Resistance is human nature and a natural part of any change process. Understanding what an individual or group perceives as a loss is the first step to dealing with resistance effectively. Because the project team and sponsor are the agents of change, it is easy to see

those who oppose as overreacting or not being reasonable. As the originator of change, the project team and sponsor have had the luxury of knowing about the change in advance and have had the time to become familiar with it. The rest of the organization, on the other hand, may gain knowledge of the change much later and, consequently, may not be at the same place for accepting the change. Subsequently, it is important that the project team and sponsor listen to the rest of the organization. Instead of arguing and trying to reason, it is better to allow people to emit their anger and annoyance. [32]

4.3 Conflicts

The theory of conflicts is closely associated with user resistance. The formation of conflict originates in cases when people recognize that their interests and standards are challenged or satisfied. Conflict management focuses on preventing, controlling, or solving conflicts. It is vital to identify possible conflicts in initial stages in order to address the conflict. Although conflict can be constructive and help create of new ideas and establish commitment, negative conflict left unsolved can lead to damaged relationships, suspicion, unresolved issues, pressure, dysfunctional behaviour, and low productivity and morale [10].

There are three different views of conflict that have developed from the late nineteenth century to today [55]. These observations are (1) the traditional view (mid-nineteenth century to mid-1940s), (2) the contemporary view (mid-1940s to 1970s), and (3) the interactionist view (1970s to present).

4.3.1 Traditional view

The traditional view considers conflict in a negative light and feels conflict should be kept away from. Conflict leads to reduced performance, hostility, and devastation if left to spiral. Therefore, it is important to manage conflict by repressing it before it happens or avoiding it as soon as possible. Harmony can be achieved through strict means, but the root causes of the conflict may not be sufficiently addressed.

4.3.2 Contemporary view

The contemporary view, alternatively, implies that conflict is unavoidable and normal. Depending on how conflict is dealt with, conflict can be either positive or negative.

Positive conflict among people can encourage ideas and creativeness; however, negative conflict can cause damaging effects if left unresolved. Therefore, positive conflict should be encouraged, while keeping negative conflict suppressed.

4.3.3 Interactionist view

The interactionist view suggests that conflict is a vital and necessary factor for performance. Although the contemporary view accepts conflict, the interactionist view supports it because teams can become dormant and content if too harmonious or still [55]. Consequently, the project manager should sporadically mix up the present state in order to support conflict to an appropriate level so that people employ themselves in positive conflict. This may, nevertheless, be a useful suggestion for many project managers. Although people may become annoyed when it is used in all situations or used inefficiently.

4.4 Overcoming the resistance

Footo in his article [16] provides several success factors based on the experiences of companies that have managed resistance well:

- *Manage the transition, not the change* — Resistance is more deeply rooted in the transition rather than the change itself. Transition is more emotional in nature, while change is more situational. Transitions are more internally felt and focus on conclusion.
- *Fear is real when pursuing change* — When fear enhances resistance, it is important to decide who is losing what, foresee overreaction, acknowledge the losses, and give something back. It is important to look for signs of grieving and allow people to vent their emotions. In addition, treat the past with respect (symbolically and literally), and let people take a piece of the past with them.
- *Keep change teams small* — Empirical evidence suggests that small, empowered teams comprised of six to eight people have the maximum impact on change initiatives. Smaller teams are better at following the policy and improvising creative answers when faced with problem.

- *Anticipate and embrace failure* — Progress toward the project goal counts. But, learning can be complicated, and setback is a normal part of the change process.
- *Use metrics* — Metrics are vital for measuring progress and for rewarding performance being made toward the change purpose.
- *Be in agreement* — Company's leaders must be in agreement in order to send clear, consistent message throughout the organization. This message should focus on the compelling reasons for the change. Dissension can fuel resistance.
- *Invite broad participation* — For a change initiative to succeed, at least 15 percent of the people who are affected by the change must be actively engaged and committed to the change.
- *Over-educate* — Management and the change agents should manage expectations and resistance through effective and timely communication. Communication should focus on the mission, vision, philosophy, process, choices, and details about the impending change.
- *It takes time* — Change does not happen immediately. Often organizations take years to prepare, practice, and build their capabilities to manage change. Companies spend years silently practicing and preparing, building capabilities, experimenting on project teams, and carefully analyzing progress.

5 IS FAILURES

This chapter will briefly introduce an overview to the factors that have an influence on the success and failure of the IS projects. There are several factor in the IS development that are identified to have a strong relationship with the failure of the IS. These factors are stated by Flowers as following:

- Hostile culture
- Weak standards of reporting
- Lack of advise and discussion
- Over-the-top determination to finish the project
- Modification demands
- Stress evoked by company politics
- Poor choice of supplier
- Lack of insight to human part of the project
- Conflicts within development team
- Leading edge system
- Project delay to original schedule
- Underestimation of the complexity of the project
- Insufficient time for thorough testing of the IS
- Shallow training of future users [15]

Ewusi-Mensah developed other issues that “contribute” to the system failures based on the research conducted in 1995. Reasons for failure based on this study are following:

- Unclear formulation of project goals
- Weak project team selection
- Insufficient management of the project
- Lack of technical know-how and skills
- Obsolete or small technology foundation or infrastructure

- Small involvement of executive management
- Growth of project costs and required time with comparison to budget estimation [13]

Unused system even though it was completed with compliance to the submission should be considered as a failure too.

Markus and Keil state in their work that unused systems are caused by these key factors: “*software usability (user-friendliness) and implementation, and bad business system design [33].*” They developed three activities that executive should adopt in such cases:

- Merge the concerns and priorities developers and managers that are responsible for system implementation
- Introduce complex recapitulation of the system submission and initiate the remedy plans in order to reach the full usage of the system and restore its value
- Do not hesitate to make determined investment decisions by thorough measurement and control of the system use and value.

Meanwhile the specialists and developers of the system should:

- Realize that they are responsible also for the usage of the system, not just its development.
- Concentrate also on the system design concept as a surplus to user requirements for the system and always try to develop several variants of the design solution.
- Adopt or develop ways to truly get user to participate on the design concept. [33]

The success of an IS project is determined by various factors. Its survival however mostly depends on the thorough planning from the initial problem/target situation definition, through submission creation to testing and implementation. Furthermore, the involvement of all stakeholders of the project (users, developers, managers, specialists, designers, tutors, etc.) and their continuous up to date informing is critical for any project success. [29]

6 IS SECURITY MANAGEMENT

The key principal of information security is the thorough analysis of risks. Risks concerning information of the company are loss, misuse or destruction of important information and databases. After conducting such analysis the company executive should consolidate a clear information security policy. The International Organization for Standardization developed in year 2009 a new series of standards for information protection. [8]

According to the ISO 27000 the ISMS (Information Security Management System) serves as a: *“model for establishing, implementing, operating, monitoring, reviewing, maintaining and improving the protection of information assets to achieve business objectives based upon a risk assessment and the organization's risk acceptance levels designed to effectively treat and manage risks. Analyzing requirements for the protection of information assets and applying appropriate controls to ensure the protection of these information assets, as required, contributes to the successful implementation of an ISMS.”* [22]

There are four basic fields of information protection:

- information storage structure security
- staff-based security measures
- technical and accessibility to information security
- security of information technologies [8]

All information that is in possession of an organization can be attacked, defected or destroyed (e.g. blackout, fire) and there is also a risk of misuse of the information. The term information security is generally based on information being considered as an asset which has a value that is a subject of adequate protection (against the loss of availability, confidentiality and integrity). The effectiveness of every business is based on the availability of precise and complete information in the required time.

A key factor of success, compliance with legal requirements and growth of a company is determined by the way that the company protects its information assets through defining, achieving, maintaining, and improving information security. These coordinated activities directing the implementation of suitable controls and treating unacceptable information security risks are generally known as elements of information security management. [22]

While ISO standards and methodology is used by many companies some companies use the ISO standards as a guideline for development of inner company's bylaws. Such a company is among other Toyota Motor Company. The structure and methodology within ISO 27000 and previous version of these standards were used in order to develop such an information security management strategies that are designed specifically to the needs of Toyota. The common most general IS security standard is a confidential questionnaire that consists of 150 questions concentrated on all of the possible weaknesses in the IS structure. The scope of the IS department employees is then to thoroughly analyze the current state of the security within the company IT based on these questions and provide answers for them.

[30]

II. ANALYSIS

7 COMPANY'S DESCRIPTION

Toyota Peugeot Citroën Automobile (TPCA) was established as a joint-venture of Toyota Motor Corporation and PSA Peugeot Citroën. Cooperation of the two industrial giants allows use of the most advanced and most efficient technologies in the automotive industry.

7.1 Toyota Motor Corporation

The largest Japanese manufacturer Toyota is an actual automobile giant that combines the Toyota, Lexus, Daihatsu and Scion brands. In the year 2005, their combined sales reached an incredible 6, 78 million vehicles and therefore, placed Toyota as the second largest manufacturer in the world. This success was largely due to the good reputation of Toyota vehicles well known for their quality and reliability. Toyota is not only a term used among customers but also among specialists of the automobile industry. The manufacturing system based on ingenious organized work, highly efficient and uncompromising quality that Toyota put in effect 50 years ago is an inspiration for all other manufacturers. Apart from the 12 manufacturing factories in Japan, Toyota manages 52 factories in 27 countries of the world including the Czech Republic.

7.2 PSA Peugeot Citroën Company

PSA Peugeot Citroën Company is a significant player in the world of the automobile industry. Its force is fuelled by the traditional European brands Peugeot and Citroën that are combined under the wings of one company but each have its own cover and style. In the past five years, both companies experienced a sharp rise in sales that belong to one of the highest climbs in the automobile industry. This success is due to the attractive design, technological advances and the ability to respond to the customer's requests. Due to the increased interest in vehicles from the PSA Peugeot Citroën manufacturing company, the company expanded to Central and Eastern Europe. The purpose was not only to strengthen the business market but also to build new production capacities. Aside from the TPCA project, the PSA Peugeot Citroën Company is also building a new producing factory in the Slovak Republic's Trnava. [55]

7.3 TPCA's profile

Official name: Toyota Peugeot Citroën Automobile Czech s.r.o.

Turnover: 1 800 000 000 EUR (2008)

Products: Toyota Aygo (1/3 of production)

Peugeot 107 (1/3 of production)

Citroën C1 (1/3 of production)

Production: 330 000 cars a year

1050 cars a day

Employees: approx. 3500

Export: 99% of production

Suppliers: approx. 80% from the Czech Republic

Start of production: 28. 2. 2005

System of work: 3 work teams in two-shift operation

Executives: Satoshi Tachihara (President)

Bernard Million-Rousseau (Executive Vice President)

Jiří Černý (Production Vice President)

Address: Průmyslová zóna Ovčáry

280 00 Kolín

tel.: 321 777 111

fax: 321 777 242

email: (info@tpca-cz.com)

7.4 TPCA's history in milestones

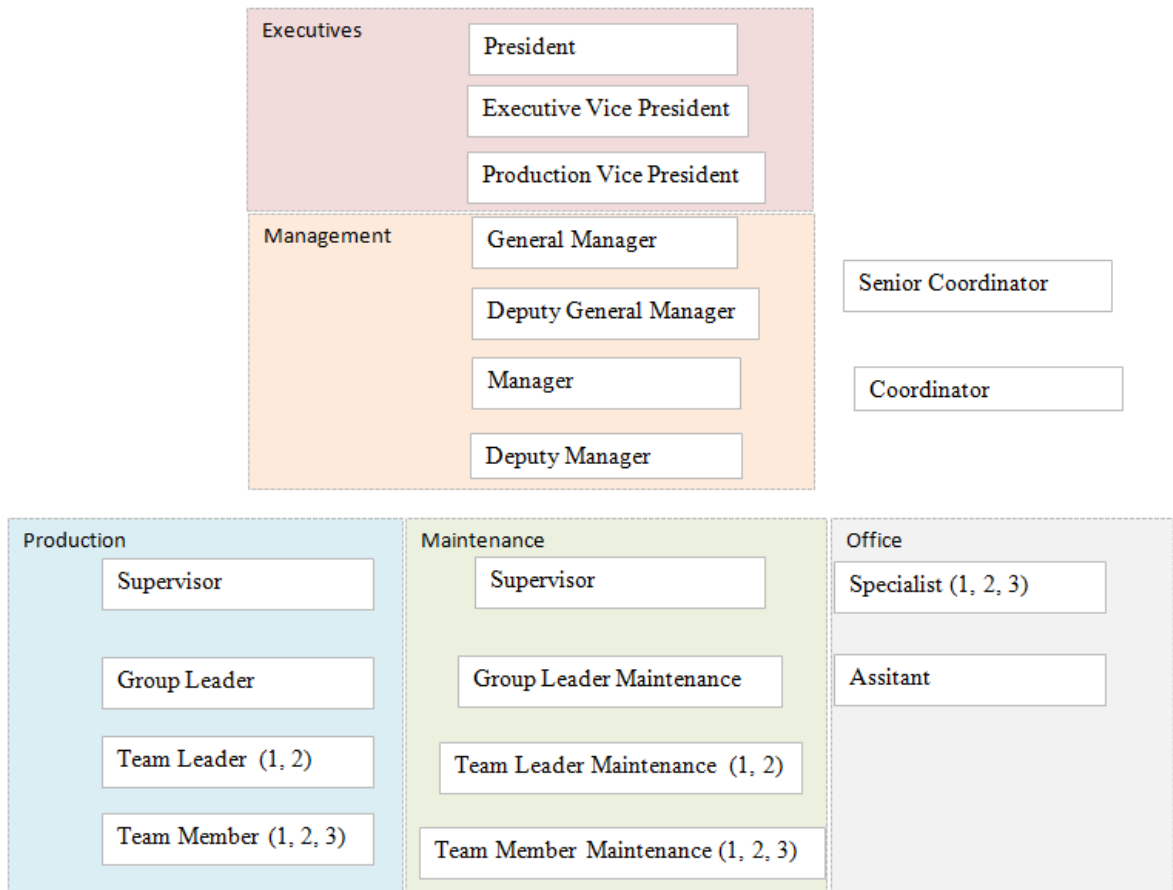
Beginning of 2000 Toyota and PSA Peugeot Citroën consider cooperation in production of small cars

July 12, 2001 agreement on cooperation signed in Brussels

December 2001	Czech authorities were officially informed about choosing Kolín for construction of the common plant
January 8, 2002	a joint-venture agreement between PSA Peugeot Citroën and Toyota was signed
April 10, 2002	the foundation stone was laid in Kolín-Ovčáry
September 2002	construction works on the common plant started
November 2004	integrated IPPC permit granted
December 2004	trial run permit granted
January 2005	transformation to working hours based on shifts
February 28, 2005	start of commercial production
February/March 2005	official introduction of the Aygo, 107 and C1 models at the Geneva car show
May 31, 2005	ceremonial opening of the plant of TPCA
June 27, 2005	two-shift operation
October 2, 2005	three-shift operation
December 19, 2005	100 000th car produced in TPCA
February 28, 2006	the first Collective agreement between TPCA and the labor unions signed
April 23, 2007	500 000th car produced in TPCA
December 19, 2008	1 000 000th car produced in TPCA [55]

7.5 Manpower structure

Roles within the company are visualized on the following picture. Hierarchy within one role is descendent (Team member 3 is higher on the structure level than Team member 1). Roles senior coordinator and coordinator are embodied by expats from Toyota Motor Corporation and PSA. Their main duties are to monitor and report information about company to mothers.



Picture 2 TPCA manpower structure (by author)

8 PRODUCTION INDIRECT WORKFLOW ANALYSIS

In this part of the thesis the present state analysis the administrative workflow and processes will be described. The data were collected through semi-structures interviews within indirect Group Leaders (GLs) in TPCA in January and February 2011.

8.1 The survey

The survey was designed to investigate the administrative workflow of the indirect GLs. The survey was focused primary on those activities that have the nature to be replaced by GLO while reserving place to other activities that by their nature do not fit the current scope of GLO but could be replaced by new functionality. The data were collected using semi-structured interviews which allow controlled process of the interview but give enough place for the respondent to describe his opinion in more possible ways that a questionnaire.

Purpose of the survey: Analyze the work and processes of indirect GLs in order to develop such changes to the system that will provide clear benefits for the users and involve them into the submission creation process.

The structure of the interview was following:

Common questions for both Maintenance and Production indirect

TRAININGS AND MEDICAL CHECKS

1. How do you manage evidence regarding trainings/medical checks of your workers?
2. What types of trainings are relevant for your workers?
3. How are trainings assigned to workers?
4. How do you check validity of the trainings/medical checks?
5. How do you communicate with other related subject in TPCA? (Health and Safety department, Kardia (company's medical office))

PLANNING OF ABSENCE

1. How do you enter and check the attendance?
2. How do you plan vacation?

3. What administrative activities do you undergo when borrowing/lending workers from other GLs?
4. What kinds of information regarding absence do you report?
5. How do you work with ELANOR?
6. What means do you have to control planned/unplanned absence in the future?

ADDITIONAL QUESTIONS FOR MAINTENANCE

1. What other information systems are working with and do you see any possibility of connection of these systems with GLO?
2. What are your administrative processes regarding health problems of workers?
3. Are there any other administrative processes regarding human resources?

ADDITIONAL QUESTIONS FOR PRODUCTION INDIRECT

1. Do you maintain the multiskill of your workers?
2. Do you lend your workers to the production line?
3. What other information systems are working with and do you see any possibility of connection of these systems with GLO?
4. Are there any other administrative processes regarding human resources?

70 percent of the maintenance GLs participated in the survey and 100 percent of the production indirect GLs that are not yet included in the GLO participated in the survey. The interview structure was designed with the consultation of manager. The pilot study was conducted with the IS department developers and minor changes were made to the final version of the interview structure as described above.

8.2 Survey results

The results of the survey will be divided based on the modules of GLO. First the processes that based on their nature fit into the module 1 that deals with trainings and medical checks and second the processes that deal with planning of absence. Subsequently the survey showed that there are no other processes regarding the management of human resources that would compose a base for a new module in the GLO.

8.2.1 Health and safety trainings processes

Trainings and medical checks are currently controlled using various excel files. Every GL has an access to excel file that is managed by Health and Safety department. This file contains list of all workers and them allocated trainings. By filling a certain cell (day and type of training) in this file GL registers his workers on selected training. This file can be also used to monitor validity of each trainings due to conditional formatting of the table (expiring training is under colour in red). However, most GLs carry out their own private excel file in which they control information about trainings for their workers (there is a lack of control that in such files all trainings are listed – trainings that are managed by GL himself are often except from these files).

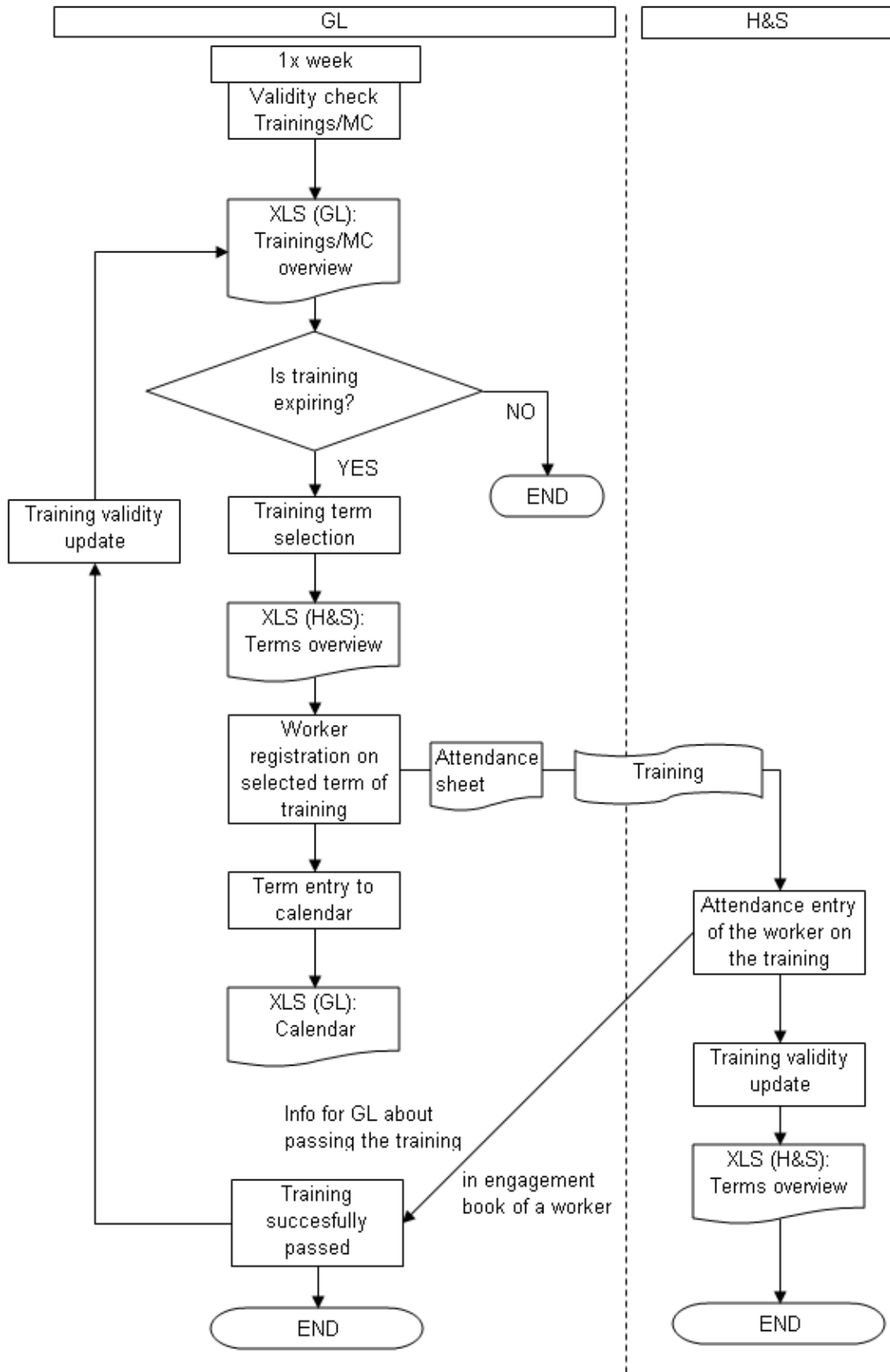
After detection of expiring training GL registers his worker on selected date of training via excel file managed by Health and Safety and makes a mark of this training to his private calendar in excel form (the calendar entry is not a condition).

When the worker finishes his training Health and Safety enters down his participation in ELANOR information system and updates the validity of his license in the excel file. Simultaneously record of his participation on the training is entered into his personal engagement book. Based on this record the GL has a control tool that the worker passed the training and updates the validity of the training in his private excels file.

Operations regarding medical checks are analogical to H&S trainings.

Examples of these documents are available in Appendix II.

The process is visualized on the following diagram.



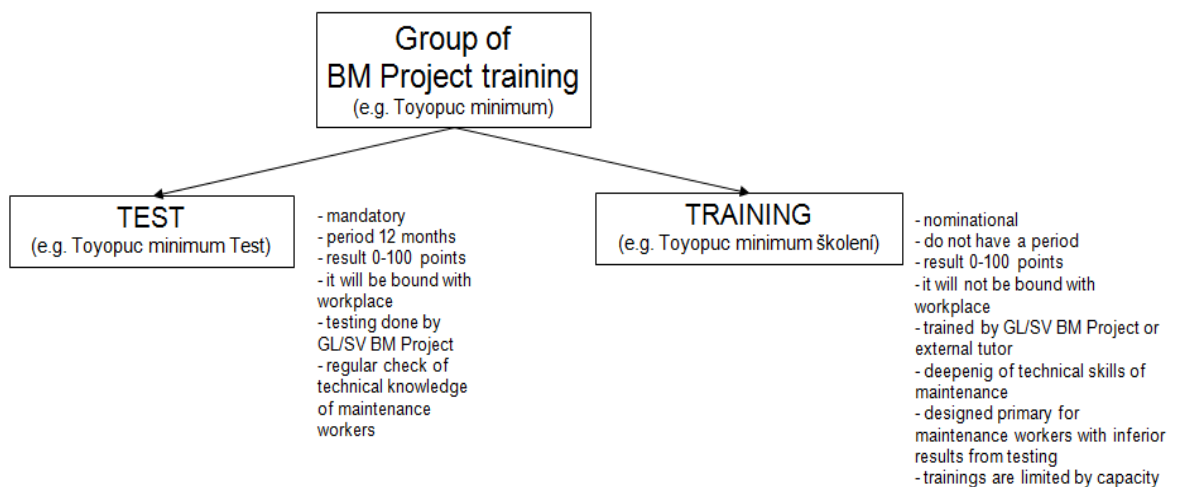
Picture 3 H&S trainings process diagram (by author)

8.2.2 Body Manufacturing Project knowledge testing and practice evaluation

In the scope of maintenance there is once a year knowledge testing of every maintenance worker (TLM 1, 2 a TMM 1, 2, 3) organized. Terms of the testing are listed by the BM Project department in cooperation with HRD (Human Resources Development). These terms are announced through emails to each GLM who subsequently register their workers for these terms (and alternatively note these terms into their personal calendars in excel file. After the end of testing the results of individual workers is entered by GL/SV BM Project to excel file Maintenance Skills Matrix, which is located on the network. Through this file GLM can get information about the results his workers gained at the testing.

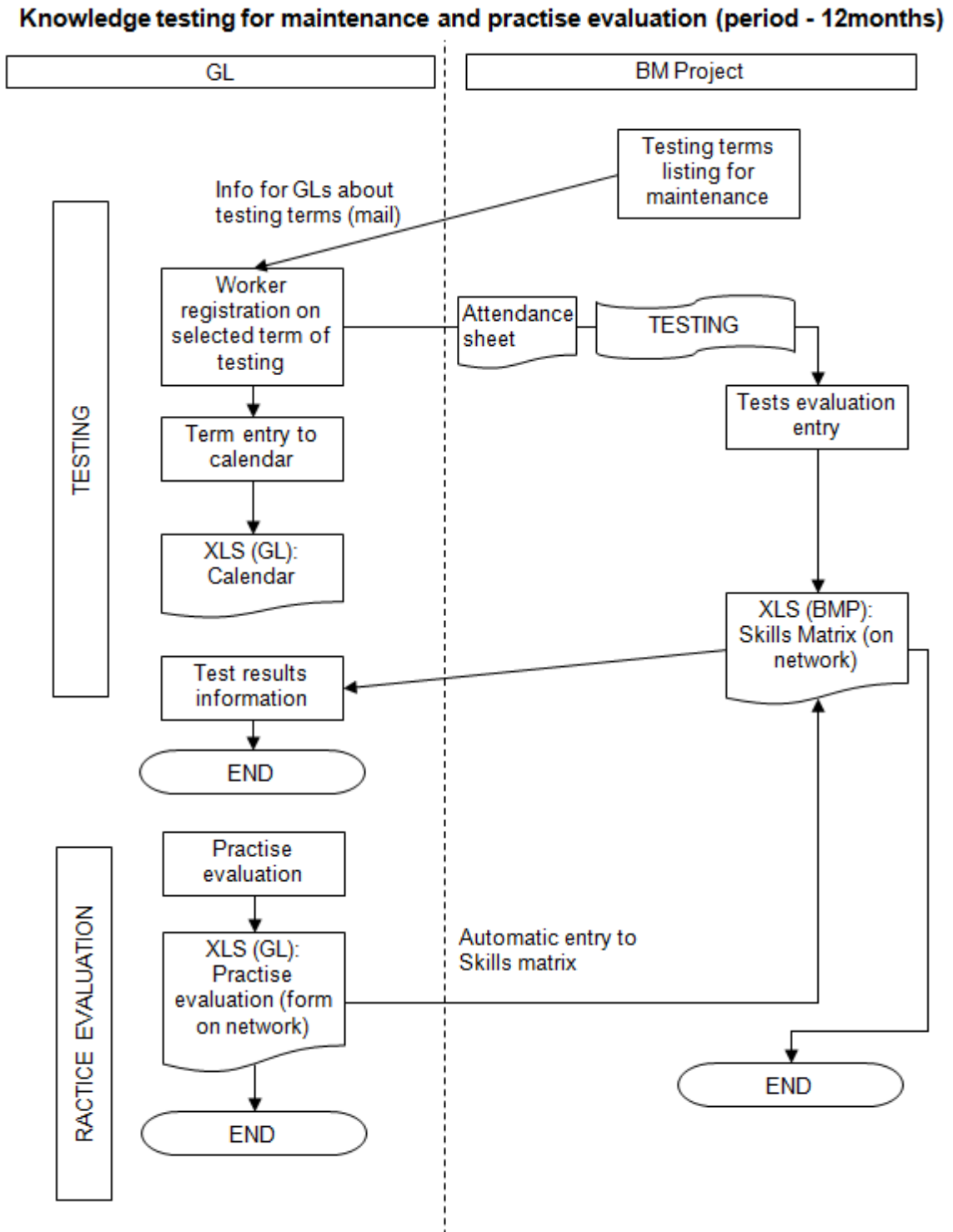
Simultaneously with the knowledge testing GLM also fills in the form regarding the evaluation of practice of his workers. This form is located on the network and after its entry the final evaluation is automatically entered to the Maintenance Skills Matrix.

The following picture shows basic division of BM project trainings to Tests and Nomination trainings for maintenance workers.



Picture 4 BM Project trainings differences (by author)

This process of annual testing and practise evaluation is visualized on the following diagram:



Picture 5 BM Project – Testing and practice evaluation (by author)

8.2.3 Workers registration for Body Manufacturing Project trainings

BM Project department organize for maintenance workers besides annually testing also trainings that are focused on increasing knowledge for each topic. These trainings are

voluntary-based and do not influence the period of testing (12 months). Training is concluded with a test that replaces the result of relevant test.

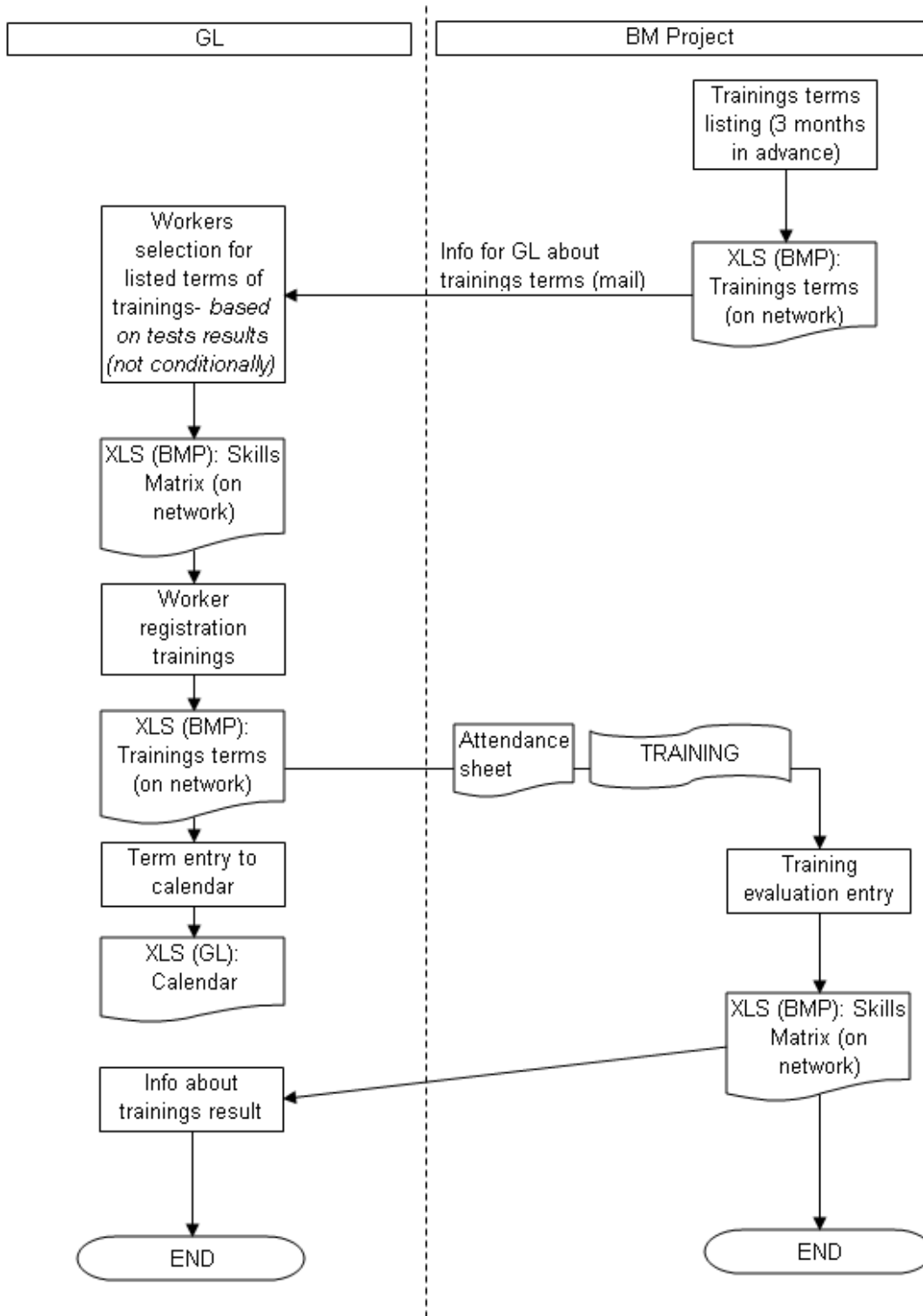
The document flow is as following:

1. Terms of individual trainings are listed 3 months in advance (for example: on 1.12. trainings for January to March are listed).
2. GLMs are informed about the listing of new set of trainings through email. GLMs use an excel form on the network to register their workers on trainings.
3. Selection of workers to be registered on the training is fully in control of the GLM. Nevertheless, GLM should reflect in the selection results of testing and prefer those workers that have received inferior evaluation.
4. Registration on terms of trainings is conducted through excel file on network and trainings have limited capacity. Currently the registration principal work on the basis of “first come, first served.”
5. GLM usually also notes the term of the training into his private calendar in excel form.
6. XLS form also serves as an attendance sheet for individual trainings.
7. Results of the test at the end of training are entered by GL/SV BM Project into the Maintenance Skills Matrix which is located on the network.
8. Entered result also works as a confirmation of attendance of the worker on the training for his GLM.

Examples of these documents are available in Appendix II.

This process is visualized on the following diagram:

Workers registration for BM Project trainings

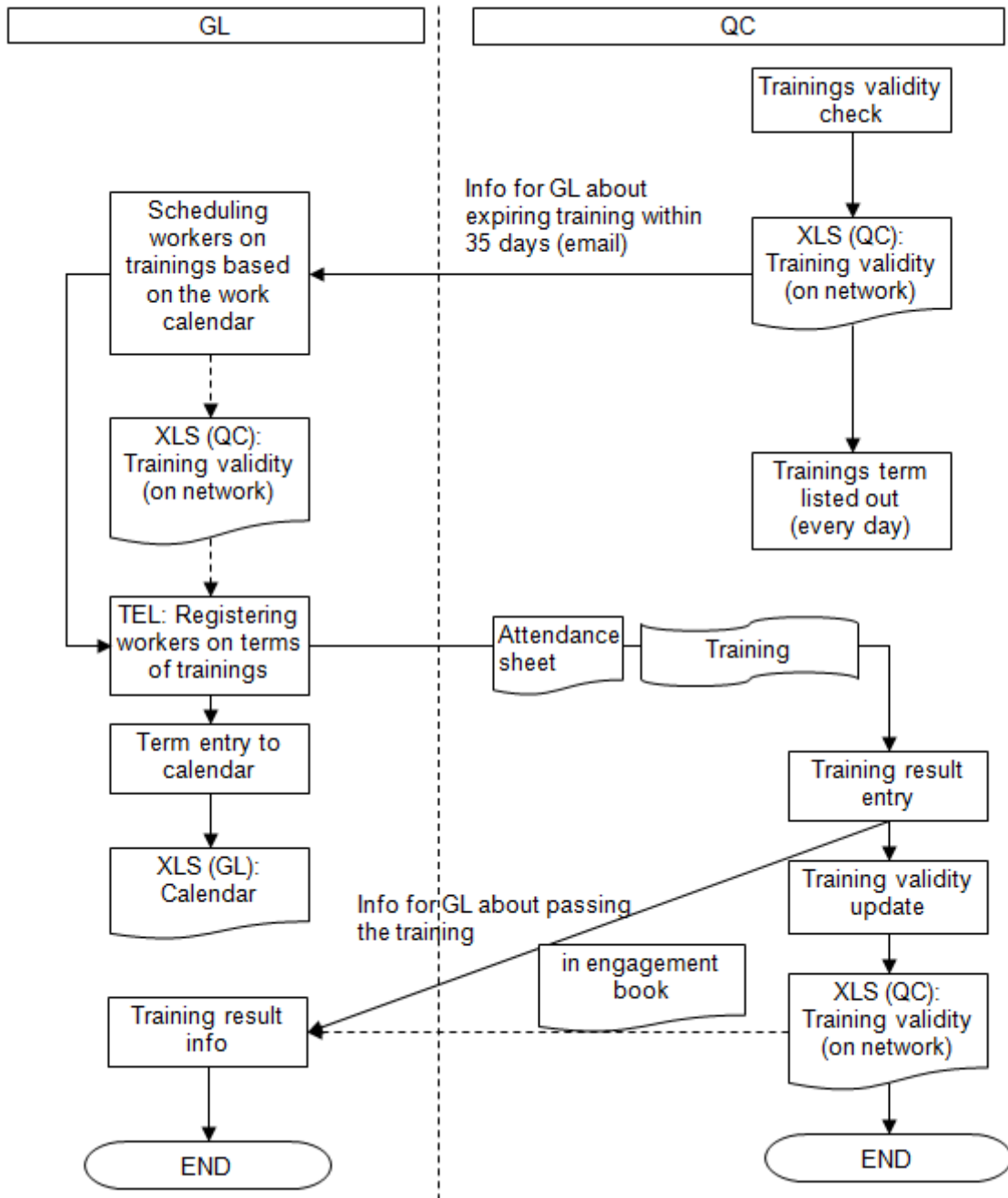


Picture 6 BM Project trainings registration (by author)

8.2.4 Quality Control Trainings

Quality Control Shop organizes periodical trainings for all workers across the TPCA Czech; s.r.o. QC department lists out terms of trainings on daily basis. In the excel file of QC the evidence of all workers that have certain WC training assigned is recorded including the expiration date. The assignment of trainings is controlled by QC Shop. This excel file is solely managed by QC and its read-only version is accessible via network. QC workers inform using email those GLs whose workers have an expiration date of certain training within 35 days. GL then telephonically negotiate with QC a set term of training for his worker. After successful passing of the training the excel file “Trainings validity” is updated and worker receives a confirmation of the training into his engagement book (or Evidence carte in case of QC workers)

This process is visualized on the following diagram:



Picture 7 QC Trainings (by author)

8.2.5 Human Resources Department Trainings

Human Resources Development department organizes various courses focused on professional growth for workers in TPCA Czech, s.r.o. Individual trainings are administered in XLS files and their attendance is also recorded in ELANOR. Trainings are specific by not having a period and they are passed by workers only once. Individual trainings are connected with relation to worker’s role (different set of training for TMs,

TLs, GLs, etc.). These trainings can be divided into mandatory (based on the role of the worker) and nomination (based on the nomination of the superior). The same methodology of terms listing, workers registration and attendance entry applicable to H&S and BM Project trainings applies to HRD trainings. Terms (their amount) are listed based on the email survey done by HRD department. GLs are then informed about listed terms through email. Email communication is also used for workers registration. The record of all trainings and attendees is kept in XLS files and ELANOR.

8.3 Summarization of all trainings

In the following table all trainings topics are listed including the current status of being managed in GLO or yet to be included:

Table 1 Trainings in TPCA (by author)

Trainings topic	Training administrator	Currently Managed in GLO	In GLO after extension
QC	QC	no	yes
BM Project	BM Project	no	yes
General Maintenance Training			
PLOŠINY	H&S	yes	yes
PC KURZY	HRD	no	yes
Induction Training Temporary	HRD	no	yes
GL Role	HRD	no	yes
Lékařské prohlídky	H&S	yes	yes
Požární ochrana	H&S	no	yes
Induction Training	HRD	no	yes
ELEKTRO vyhl.50	H&S	no	yes
Soft Skills	HRD	no	yes
ZAŘÍZENÍ	H&S	no	yes
Environmentální školení	H&S	no	yes
Vysokozdvih, tahač	H&S	yes	yes
BOZP	H&S	yes	yes
SVÁŘENÍ	H&S	yes	yes
Specific Maintenance Training			
Global Content Trainings			
Language Course	HRD	no	yes
TPS Training	HRD/OMD	no	yes
Jeřáb, vazač	H&S	yes	yes
GL komunikace	HRD	no	yes
QCC Training	HRD	no	yes
Lino Site Training			
Shop training	GL, OMD	yes	yes
TL role	HRD	no	yes

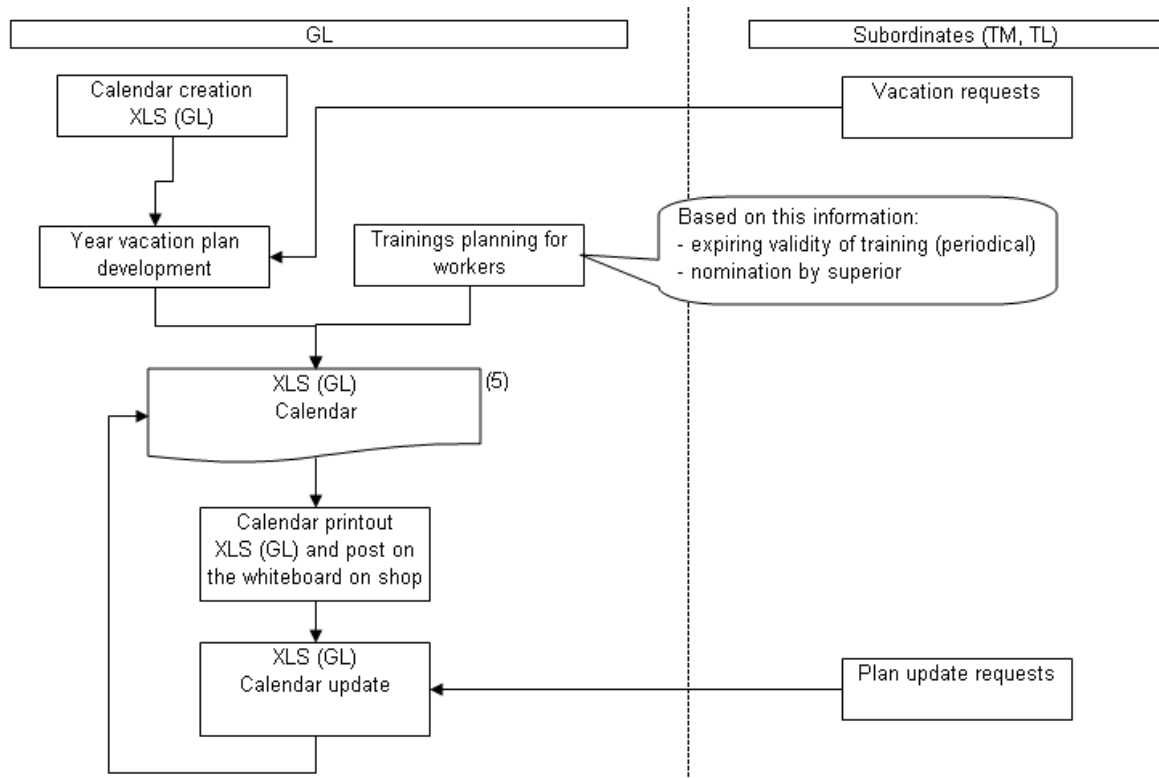
H&S Managers Training			
Fire Protection Managers Training			
Referenční zkoušky	H&S	yes	yes

Topics with gray colour in rows are historical and they are not used anymore in TPCA, however, the historical data are kept.

8.4 Planning of absence

Planning of vacation and other forms of absence is currently conducted by GLs in form of calendars in excel files. These calendars do not have united form and alter by GL. Nonetheless, the core principal remains the same. GL manually enters planned vacation, floating leave (in case of maintenance calendar (12hrs shifts – uninterrupted operation -> 2 days of paid leave for a ¼ of a year)), current amount of hours of compensatory leave, planned terms of trainings and other form of absence into the excel Calendar. The calendar in excel usually contains counter for days of vacation and floating leave. Connection to external data sources is missing and GL has to enter nearly every data enter manually. The calendar is further printed by GL in A3 paper size (whole year) or A4 paper size (by month) and posted on the notice board next to the GL's office at the Shop. Individual workers then have a possibility to plan their vacation into the printed calendar which, however, must be yet approved by theirs GL.

Examples of the XLS version of GL's calendar is available in Appendix II.



Picture 8 Planning of absence workflow (by author)

8.5 ELANOR information system

ELANOR information system is a product for management of human resources. Its primary function is salary management and calculation. ELANOR is used throughout the company by all superiors as an attendance record tool. The real attendance in the company is always recorded in this system. Based on the attendance the payroll department calculates the salary of all workers. Besides attendance, record of all trainings is kept in the ELANOR as well. The GLO is synchronized with ELANOR on daily basis regarding the attendance and passed trainings.

9 GROUP LEADER OFFICE DESCRIPTION

The purpose of Group Leader Office information system is to simplify and standardize administrative activities concerning management of workers in the company TPCA Czech, s.r.o. Information system Group Leader Office consists of six individual mutually connected modules:

- Module 1 – Medical checks/trainings
 - Management of trainings and medical checks (registering for training schedules, monitoring of validity of licenses, training schedule creation etc.)
- Module 2 - Absence
 - Planning of vacation and other forms of absence, headcount monitoring
- Module 3 – Knowledge and process audits
 - Administration of audits
- Module 4 - Rotations
 - Planning of rotations, creation of rotation teams
- Module 5 - Rotation – Stamping
 - Planning of rotations at Press shop
- Module 6 - ESI
 - Administration of ESI (Early Symptom Indicator)

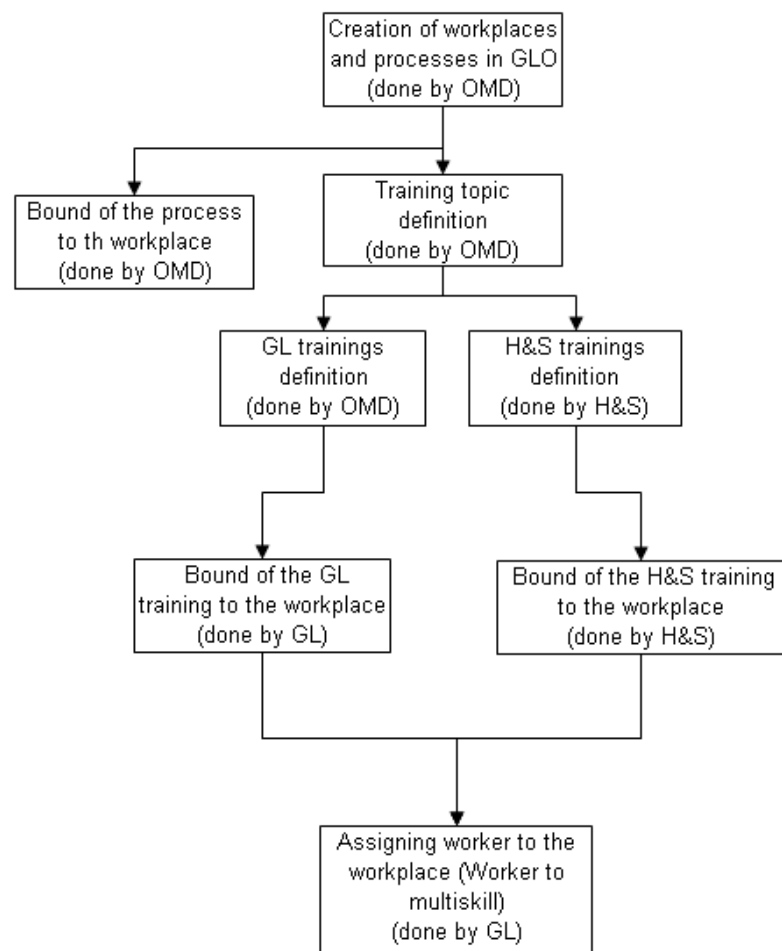
User can also find these bookmarks within the system:

- Administration
 - System setup
- Ergo Reporting
 - Information and reporting for the needs of ergonomic teams
- Task-book
- List of to-do-activities for GL

9.1 Medical checks and trainings in Group Leader Office

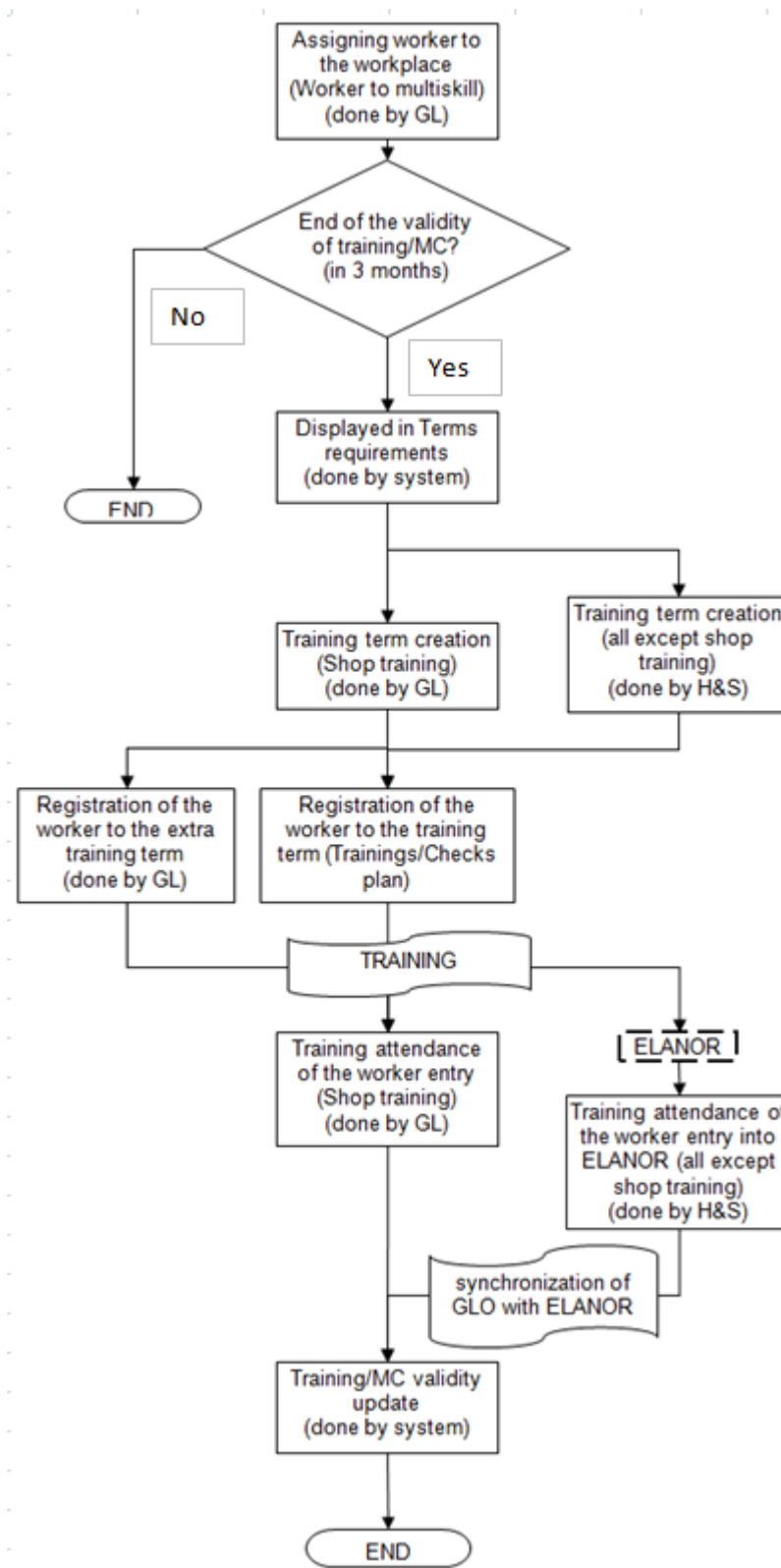
This chapter describes general methodology of work in the GL Office regarding administration of trainings and medical checks. The basic principal of data linkage through system is following. Individual workplaces and associated processes are established in GLO by OMD (Operational Management Development department). OMD then creates new trainings topics that bound individual trainings together. Individual trainings are then created and defined (length of period, following trainings, etc.) by H&S together with OMD. These trainings are then bound with workplaces in the system. This bound is done by H&S for all trainings except Shop trainings (these trainings are bound by GLs). GL then

allocate his workers to these workplaces and the relation worker – trainings is established. Each worker needs all trainings allocated to the workplace in order to work on such workplace. System automatically controls the validity of the training bound with the worker and informs the GL 3 months in advance about its expiration. GL then using the bookmark Plan of trainings/medical checks registers his workers to terms of relevant trainings that are listed by H&S or by himself (shop trainings) created in GLO. System primary allows GL to register workers with expiring training within 3 months. However, GL can register other workers to training using bookmark Extra term. After the worker attended and passed the training the attendance is entered to ELANOR and synchronized with GLO (the synchronization takes place every day) and the validity of the trainings is renewed (for a period of time defined in Training type – template definition). Primary setup of the Module one is visualized on the following diagram:



Picture 9 Module 1 primary setup (by author)

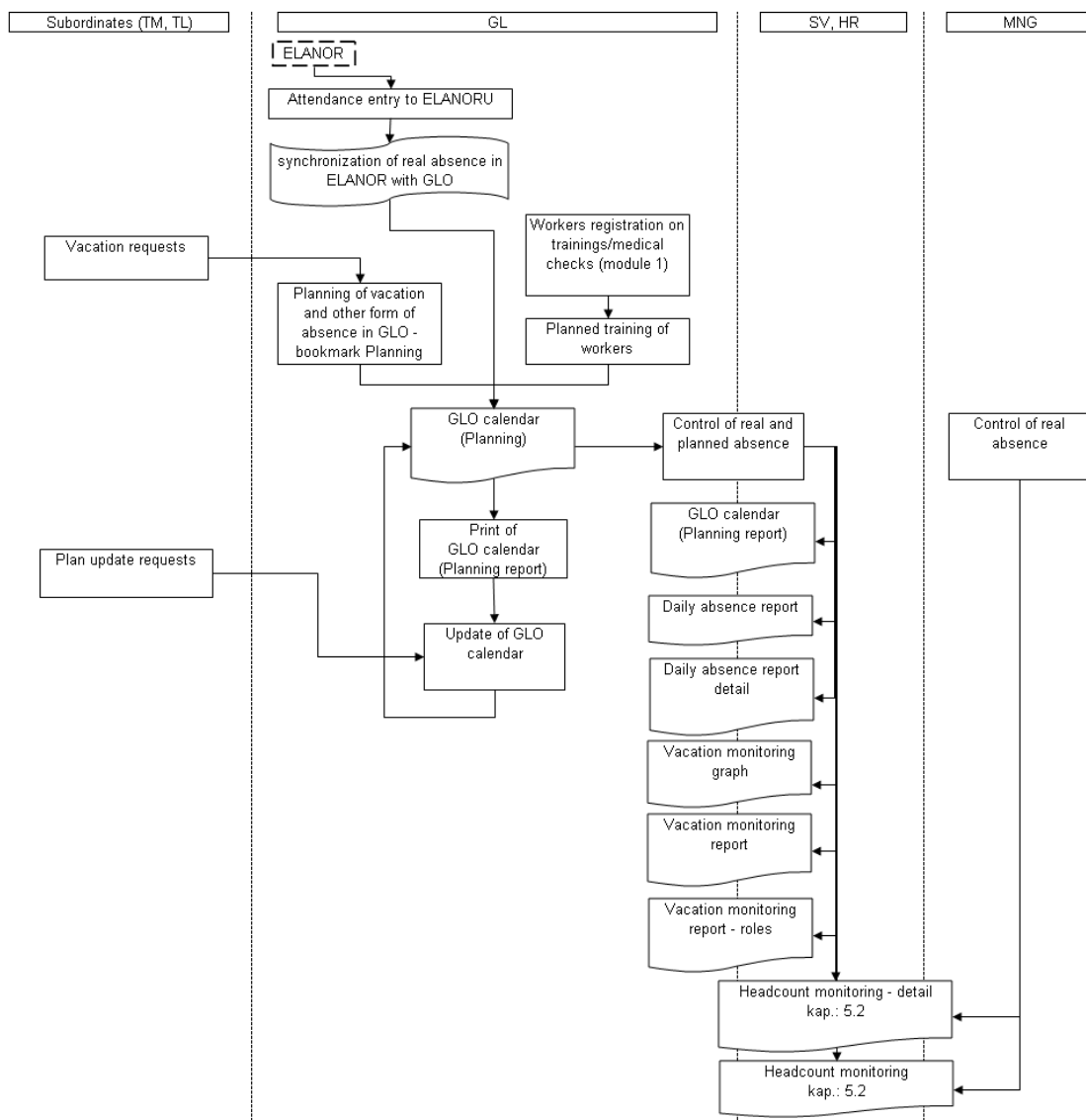
On the following diagram the routine work of GL is visualized. It is succession of processes from Assigning worker to a workplace to renewal of the validity of the training.



Picture 10 GLO training processes (by author)

9.2 Planning of absence in Group Leader Office

This chapter describes general functionalities and data linkage in module 2 that deals with planning of absence of GL's workers. For planning of absence GL uses Planning form that is in a form of calendar. Using filtration menu GL selects time period for which he wants to plan an absence. Individual days are in columns and worker in rows. After clicking on certain cell in the calendar GL can plan an absence for certain worker (vacation, supplementary leave, illness, etc.). Individual forms of absence are matching their codes in ELANOR. Planned absence is displayed in the calendar in relevant cell and in available reports in module 2. List of reports in module two and visualisation of the process in on the following diagram:



Picture 11 Planning of absence in GLO (by author)

9.3 Headcount reporting in Group Leader Office

Due to the fact that Group Leader Office currently does not include complex information about the count of direct and indirect manpower in the company (count of hired personnel, attendance, absence, etc.) For such reason workers in Human Resources cannot fully use data from GLO and are forced to operate within two databases (ELANOR, GLO). This situation is highly time-consuming. Other users of this functionality will be individual GLs, SVs of indirect manpower and also the management of the company, which will be provided by these reports important information regarding effective management of human resources.

10 PROJECT SCOPE

Extension of GL Office is targeted to all indirect workers in TPCA Czech, s.r.o. with exception of office workers. Nominally, it includes all workers in maintenance and production indirect (P.I.) teams on lines with calendars not yet included in the system. Complete overview is in the following table:

Table 2 Scope of extension of GLO (by author)

Maintenance								
Department	SHOP	Line	CC code	Role	Org. Str. code	Calendar	Note	
Body Manufacturing	Press	Press Mnt.	L1000	SV	11112	1		
			L121A		111121	FA		
			L121B	GLM	111122	FB		
			L121C		111123	FC		
			L121D		111124	FD		
	Weld Eng.	Weld Mnt.	L231A	GLM	111411	FA		
			L231B	GLM	111412	FB		
			L231C	GLM	111413	FC		
			L231D	GLM	111414	FD		
			L2310	SV	11141	AS		
			L4000	MNG	1114	1		
			BM Project Mnt.	L2500	GLM	111441	AS	
					GLM	111441	AS	
	SV	11144			1			
	DM	11144			1			
Paint	Paint Eng.	Paint Mnt.	M121	GLM	113221	FA		
				GLM	113222	FB		
				GLM	113223	FC		
				GLM	113224	FD		
				SV	11322	1		
				MNG	1132	WEB		
Final Assembly	Assembly Eng.	Assy Mnt.	M241	GLM	112411	FA		
				GLM	112412	FB		
				GLM	112413	FC		
				GLM	112414	FD		
				GLM	112415	AS		
				SV	11241	AS		
				M4000	MNG	1124	1	
Production Control	Facility	Facility	J2000	SV	11541	WEB		
			J2000	GLM	115412	AS	subordinates A,B,C,D, calendar	

Production Indirect							
Department	SHOP	Line	CC code	Role	Org. Str. code	Calendar	Note
Body Manufacturing	Welding	Kaizen	L2400	GL	111241	PCT	subordinates A,B,C,D, calendar
		CMM	L131	GL	111294	1	subordinates A,B,C,D, calendar
Paint	Paint	TSG	M111	GL	113111	FA	
					113112	FB	
					113113	FC	
					113114	FD	
		TSG + Training	M1100	SV	11311	WEB	

Considering the results of an analysis (described further below) the system will be extended in modules 1, 2, 3, 6 (Lending indirect workers to direct lines (to rotation in modules 4 & 5) should function on the basic settings in module 3). Whereas, it is important to consider that inclusion of maintenance to the GLO will be more sophisticated due to its

specifics, P.I. teams will be included (some P.I. teams have already been established in GLO) to GLO simpler due to its significant resemblance to direct production teams.

Future users of GLO system:

- MNG – shop managers (within the scope of maintenance and P.I. – other MNGs already in system)
- SV – supervisors in maintenance (other already in system), SV BM Project
- GL – Group leaders of P.I. teams
- GLM – Group leaders of maintenance, GLM BM Project

Managed subjects in GLO

- TL 1, 2 – Team leaders of P.I. teams
- TLM 1, 2 – Team leaders of maintenance
- TM 1, 2, 3 – Team members of P.I. teams
- TMM 1, 2, 3 – Team member of maintenance

10.1 Project Team

The responsibility of the project and submission creation lies on the Operational Management Development department (OMD). The project leader is specialist from OMD. The technical support is provided by Information system department and end-user feedback is provided by establishing of working group with window persons from each shop of interests. The responsibilities are following:

Project leading team (OMD): Create working group, make plan, plan follow-up, submission preparation, submission approval by working group, budget management, issues management, functionality testing, manual creation and testing, communication, reporting to management and executives, consultations with superiors

Technical support team (IS): quality gate, communication with supplier, external work price confirmation, system testing and implementation, technical issues solution, consultations with superiors

Working group: Define requirements to system, communication among shop users, submission agreements within shop, final submission approval, consultations with superiors

11 EXTENSION SUBMISSION

11.1 Module 1 – Medical checks and Trainings

The basic methodology of module one will remain. Principles of terms creation, registration for terms, extra terms, attendance sheets and multiskill level assignment to a worker will be unchanged.

Trainings specifics:

- The periodicity of the training will be controlled by the system; terms will be listed by the trainings administrators.
- Trainings will not be bound with real workplaces
- Fictional workplaces created for trainings – fictional workplace starts with the letter “x” e.g.: xCrane, xFork-lift
- Creation of fictional workplace based on the role of workers (by OMD) – xTMM -> Training that are mandatory for all workers within GL’s team will be bound to this workplace

Three basic types of trainings:

- **Trainings that are mandatory for all workers** (in GLO this type is bound with xTM, xTL, xGL). These trainings will be automatically assigned to workers. Fictional workplaces will be created in the system based on the role of the worker (xTMM, xTLM, xGLM). All mandatory trainings will be bound to these workplaces. When a worker becomes a part of the GL’s team he is automatically assigned to the relevant fictional workplace (xTMM, xTLM, xGLM) based on his role (TMM, TLM, GLM). The assigning algorithm will be the same as the current one for direct workers TM -> xTM, TL -> xTL, GL -> xGL.
- **Trainings that are not required from all workers**
 - Direct - GL decides which workers he assigns to real workplace
 - Direct and Indirect – Fictional workplace - Individual fictional workplaces will be created for this type of trainings in the system (e.g. xPressure_containers). Worker will be then assigned by their GL

individually to these workplaces according to the internal bylaws of each Shop

- Example: workplace xFL (training for Fork-Lifts) is assigned to only three out of twelve workers within GL’s team.

- **Non-periodical trainings** – do not have to be bound with any workplace

Workers will have all mandatory trainings assigned in one instance (assigning to the process xTMM, xTLM or xGLM). Introduction of maintenance codes will be necessary due to role setup in the system (differences between GLM and GL in the system (access to different bookmarks in the system))

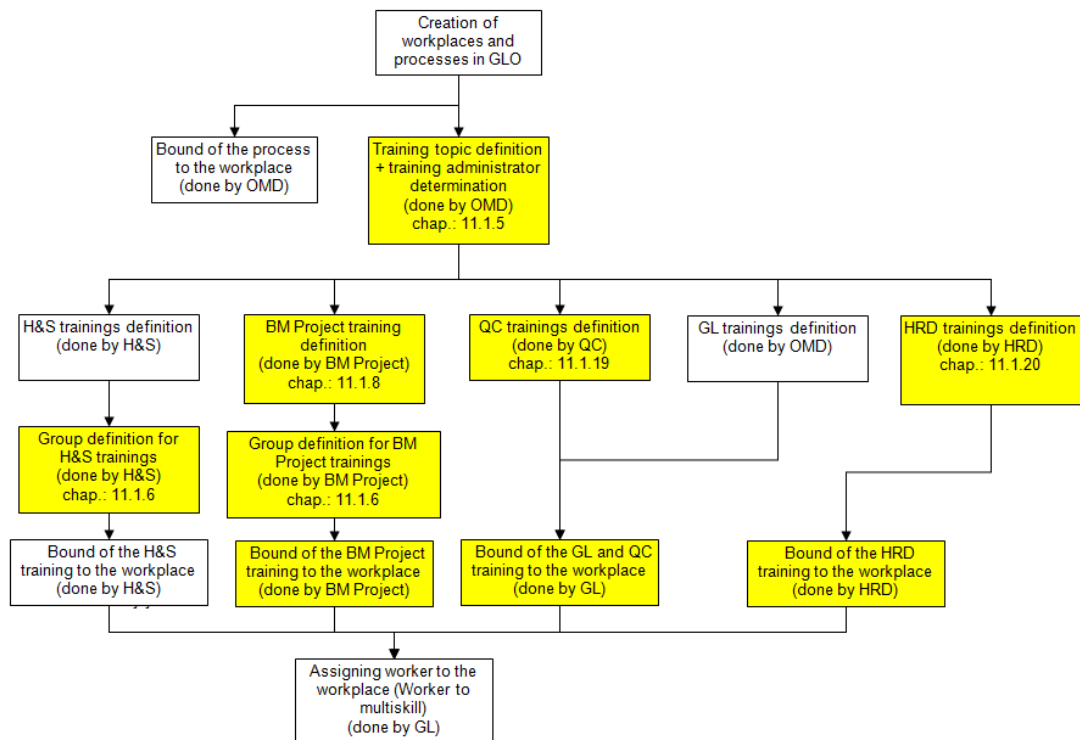
TMM – Team Member Maintenance

TLM – Team Leader Maintenance

GLM – Group Ledged Maintenance

Process mapping of the module 1 in GLO after extension

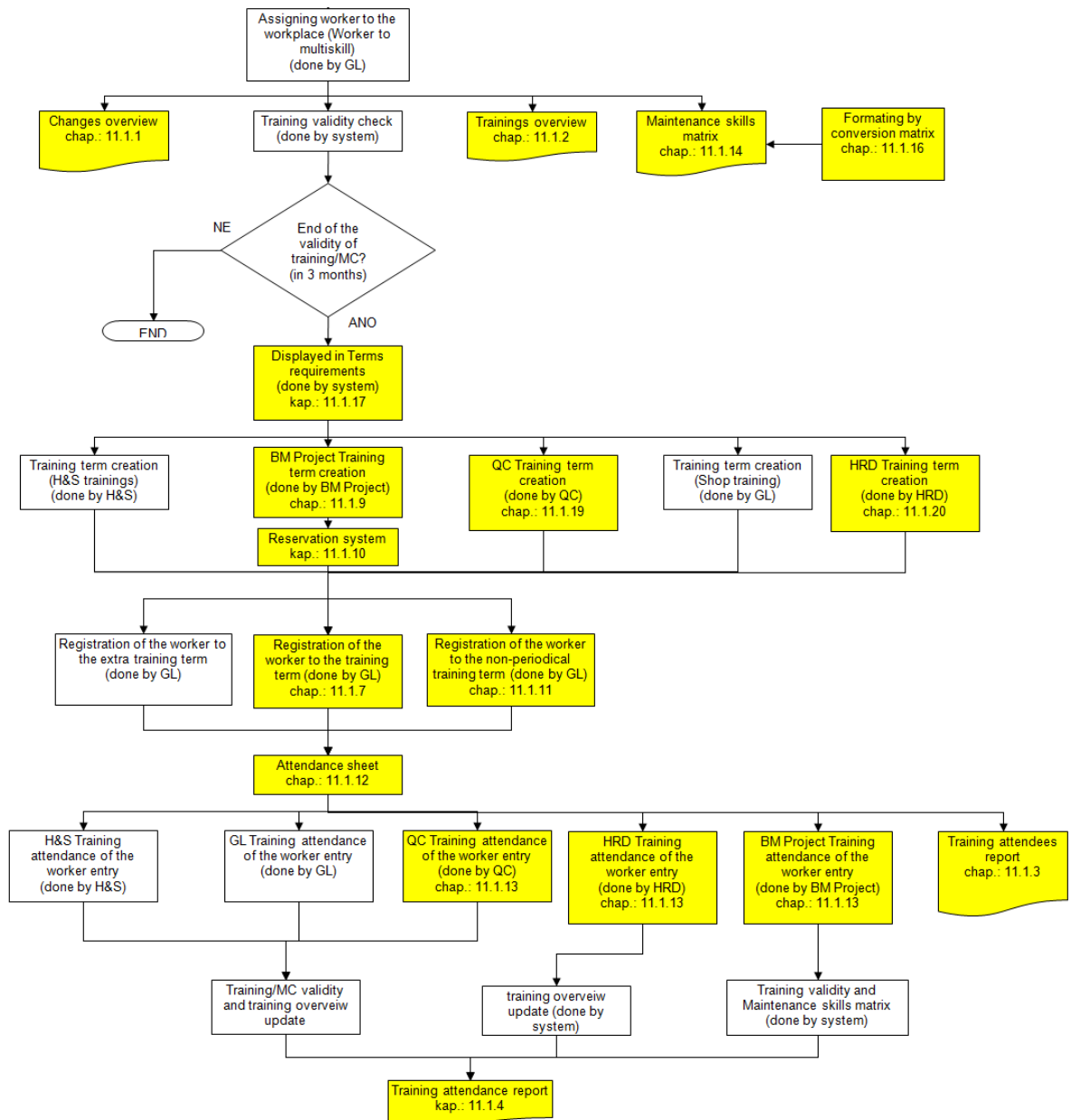
The flow of processes in the GLO after extension is described using flowchart. The first is the flowchart that describes primary setup of the module one:



Picture 12 Primary setup of module 1 after extension (by author)

Processes that are additional to current system are marked as yellow including references to the chapters in which they are described.

On the following picture there are visualized those processes in GLO after extension that represent repeated activity of the users. The diagram starts at worker assignment to the workplace and goes onto training validity update after the attendance entry (score for BM Project) on the training.



Picture 13 Trainings administration in GLO after extension (by author)

Example of the planned assignment of H&S trainings with workplaces in GLO after extension is available in Appendix III.

11.1.1 Changes overview

Name	Changes report
Change type	New feature (Bookmark)
Function	Provides complete overview of changes between worker – workplace assignment
Users	H&S, GL, GLM, SV, MNG
Current process	Such a control tool not available

In this report all changes in selected time period was conducted between workers – workplace (real and fictional) relation will be displayed, including all workplaces in the company (direct and indirect workers). The report purpose is to develop such a controlling tool that will prevent user from cancelling the bound of a worker with a workplace in order to hide expired/expiring trainings. The H&S department can monitor any changes and investigate possible cancelation of the bound.

Report content proposal:

Table 3 Changes report (by author)

Change date	Change type	Done by	Workplace	Worker	ID	Department	Shop	Line	Team	Shift
20100415	remove	Závůrka Petr	xCrance	Novak Jan	20599	BM	Press	Press Maintenance	AM	Day

11.1.2 Training overview report

Name	Training overview report
Change type	New feature (bookmark)
Function	Provides complete overview of all assigned trainings among workers within a GL's team
Users	GL, GLM, SV, MNG, H&S
Current process	Data kept in XLS files

This report displays an overview of relevant trainings within the GL's team. Valid trainings are displayed in the report by OK sign, expired and invalid trainings are displayed by NG sign with orange under colored cell (this applies also to trainings that are assigned to a worker but not yet passed by him).

This report will be available for all GLs (primarily for maintenance). Variable count of columns (depend on the amount for trainings).

Data source: all trainings except BM Project (based on the training administrator – see chapter 4.3). Any training that is assigned to at least one worker or is passed by at least one (the case of nomination HRD trainings) in the selection will be displayed in the report.

There will be a possibility to display all shift (from one line) for SV a MNG (filtration “shift“– empty). In case of extension of the system to all workers in TPCA the report will probably be developed in two versions. One version is for workers in production and maintenance (as displayed on the example) and second one for roles SV, MNG and office workers.

The proposal of the report is on the following picture:

Function	Provides complete overview of all registered workers for a training for the training organizer
Users	GL, GLM, SV, MNG, BM Project, H&S, HRD
Current process	Available only for medical checks

Report that display workers that are registered to the training only exist in the system for medical checks. This report will be extended and made amiable also for other types of trainings in GLO. Data in to the report will be limited by the role of the logged user and by the information about the Training administrator in the bookmark “Trainings topic”:

GL: Overview of workers registered to the training listed by him

H&S: Overview of workers registered to the training that is in the control by H&S

BM Project: Overview of workers registered to the training /test in the control of BM Project.

QC: Overview of workers registered to the training that is in the control by QC

HRD: Overview of workers registered to the training that is in the control by HRD

Add the column “Training location” between column “Začátek školení (Beginning of the training)” and “Pracovník (worker)”. The location of the training is defined in the training term creation form. It is information for the training term creator where the training takes place.

11.1.4 Trainings attendance report

Name	Training attendance report
Change type	Modification
Function	Gives complete extended overview of the history of all trainings
Users	GL, GLM, BM Project, H&S, OMD, HRD
Current process	Report is missing some data and it is not available to all users

The report will be available after extension for all users with relevance to their role in TPCA (GL/GLM only his workers, the same for SV and MNG) and for the Trainings administrator (QC only topic QC Trainings, BM Project only topic BM Project etc.)

The report will be extended with following information:

Evaluation

- topic = BM Project, score enter in attendance entry
- other topics = empty

Mark

- topic = BM Project
- Mark is based in the conversion matrix (4.2.10)

Tutor (event. Attendance entered by)

- User that enter attendance on the training to the system

No. of repeat

- Values within $\langle 1, \infty \rangle$
- Information about how many times the worker passed the training

The report will also include general information about the worker

- Shop
- Line
- Shift
- Role

11.1.5 Training administrator

Name	Training topic – bookmark in GLO
Change type	Modification
Function	Defines the user that will administrate training definition, terms creation and attendance entry
Users	GL, GLM, BM Project, H&S, HRD, QC, OMD
Current process	Roles divided between H&S and GL

The training administrator is a new element in GLO. It will be set in the form Topic definition and each topic will have exactly one administrator. The reason for this new parameter is to extend the flexibility of the system and allow clear and manageable control over new possible trainings to be introduced into the system. Development of this element also provides better personal data security with compliance to the legislation because it sets clear access policy in which the administrator will be able to view only his trainings and training attendees.

Users that are assigned to a role which will be selected as an administrator of trainings will have access to all bookmarks regarding administration of trainings in the system:

- training type – template definition
- terms creation

- attendance sheet and attendance sheet entry

The primary setup of the training topic and assignment of the administrator will be in capacity of OMD and IS.

11.1.6 Introduction of parameter Group

Name	Group definition
Change type	New feature
Function	Defines new parameter that will unite trainings
Users	GL, GLM, BM Project, H&S, HRD, QC, OMD
Current process	No such parameter in the GLO

This new functionality will allow selected training to be united within one group in GLO. The unification will be done in new bookmark Group definition. In this form the training administrator will have an option to select individual trainings and create a group that will unite them. Such a group will be than treated in the system as a common training in processes assigning training to workplace, creation of terms, registering workers to terms and attendance sheet print. The entry of the attendance to the system will be done by individual trainings that the group contains. For sufficient validity of the group in the system, only one valid training within the group is necessary. When the last training within the group is expiring, the group itself will be displayed in the Plan of trainings/medical checks.

Further use of the parameter Group will be used within BM Project trainings. As mentioned in chapter 9 there are two basic types of BM Project trainings – Test and Training. The group will be used to unite these two types in order to provide mutual replacement of the score achieved by worker at the end of both Test and Training in the Maintenance Skills Matrix.

11.1.7 Modification of Plan of trainings/medical checks

Name	Plan of trainings/medical checks
Change type	Modification
Function	Introduces filtration possibility to this form
Users	GL, GLM
Current process	No filtration allowed in this form

Due to future extended amount of trainings from the system extension the form Plan of trainings/medical checks might no longer provide an easy overview for the final users.

Therefore, the possibility of filtration will be developed to this form. Currently this form shows only those trainings that are expiring within three months. Based on the requests of the users this limitation will be able to be switched off. Users will be able to filter the form through these criteria:

- Training topic
- Group/Training/Medical check name
- Extend the list by all workers (not just expiring)

As a preventive safety the filter will be blanked always when the form is accessed or when refreshed. This safety instrument will be applied in order not to accidentally leave the filter active and “miss” expiring training.

11.1.8 Modification of Training type – template definition form

Name	Training type – template definition
Change type	Modification
Function	Customizes the form for the specifics of new trainings
Users	OMD, BM Project, H&S, HRD, QC
Current process	Current form options does not cover all parameters necessary for extended scope of training

This form serves for the initial definition of basic parameters of training. Only the Training administrator can define (and therefore create) particular training. This will be provided by the system access setup that will allow the administrator to view only those trainings that are included in the topic he is in charge of.

The entry form will be extended by five new parameters:

Group: information whether the training has been included into Group in the system.

Type: Applicable only to BM Project trainings. Type divides the trainings into three different types in the system. Further use of this parameter is in Maintenance skills matrix and Training attendance report. Types will be following:

A = Mandatory for all maintenance workers in TPCA Czech, s.r.o.

B = Mandatory by SHOP

C = Line trainings by SHOP

Shop: Information about what shop is the training destined for. (displayed in Maintenance skills matrix)

Variable length of training: This parameter defines whether the real training duration will be entered in to the system together with attendance entry. (Length of some training will depend on the skills of each worker)

Description: Into the text field the administrator will fill out the description of certain training (this description will be then further displayed as a pop-up window after a click on the “?” in bookmark “Non-periodical training terms”).

11.1.9 Modification of Terms creation form

Name	Terms creation
Change type	Modification
Function	Customizes the form for the specifics of new trainings
Users	GL, GLM, BM Project, H&S, HRD, QC
Current process	The form is missing several parameters for new trainings

The form for terms creation will be extended by several in order to cover all information that are essential for new scope of trainings that will be implemented in the system while current functionality will be modified and improved.

New parameters in the form:

Tutor: information about the trainer (name or role)

Location: information about where the training takes place

Deadline: Date of the last possibility to register on the training (empty -> no deadline)

Functionality alternation:

The system will be alternated in order to simplify the possibility to create more than one day training. Access to the form will be limited based on the definition of training administrator.

11.1.10 Reservation system

Name	Reservation system
Change type	Modification

Function	Provides equal chance to register workers for the BM Project trainings from each shift and preferring worker with inferior results from testing
Users	GLM, BM Project
Current process	First come, first served

In present state an undesired situation occasionally occurs. Terms of BM Project trainings are sometimes quickly filled to their full capacity. GLMs that due to their calendar get to work after several days since the trainings have been listed do not have an opportunity to register their workers for certain trainings. This situation should be improved by the function that will reserve places at the individual training for each shift.

Reservation system proposal:

14-days reservation period will come in place immediately after a new term of Training is created. During this period are the places at the training divided into the shifts I 1:4 relation. After the reservation period after 14 days is expired the free registration takes place until the 23:59 of the deadline date. Furthermore, the reservation system will be also adjusted to the desire of final users when in the duration of reservation system it will only be possible to register those workers that have received inferior result in Testing (mark 1 an 2) or have not yet attended on the certain training in their career in TPCA Czech, s.r.o.

Example:

On the first of December the term for Toyopuc Minimum training is created. This training will take place from 20.2. to 23.2. and deadline date is on je 10.2. Capacity of the training is 8 workers.

The system will operate this way:

From 1.12.to 15.12. it will only be possible to register at most two workers from each shift (not limited by Shop) that have received inferior result in Testing (mark 1 an 2) or have not yet attended on the certain training.

Visualization: AA BB CC DD

From 16.12. to 10.12. the free registration will take place. During this time everyone (GLM) can register his workers to empty (or released) term of training.

In case that the capacity of the training is not a multiple of the number 4 the rest after dividing will be accessible after the end of reservation period (when the free registration begins).

The reservation system will be activated by the training creator in the Term creation form.

11.1.11 Non-periodical trainings registration

Name	Non-periodical training registration
Change type	New feature
Function	Allows users to register their worker for the trainings that are not bound with a workplace in the system
Users	GLM, GL
Current process	GLs and GLMs register their workers on these trainings through XLS files administrated by relevant training providers

The logic of registration to these trainings will be opposite to the one currently functioning in the GLO. Terms are created in advance and GL, GLM will select individual trainings. After he clicks on the button “T” in the new screen he selects from a roll-down menu or list (depends on the development costs) worker he wants to send to the training (in the roll-down menu GL, GLM only sees his workers). The system will also inform the user about any other absence of his other workers in the selected date of training. This is informational only and it does not restrict the GL, GLM from registering his worker on the selected term.

Basic principal: Terms of trainings are listed, GL then selects the term and then he registers his worker(s) on the term.

Only trainings that have not established bound with a workplace will be displayed in this form.

This new functionality applies primarily to the maintenance – BM Project trainings. However, it should allow future use in case other non-periodic trainings are introduced to the system (e.g. HRD trainings).

The proposed interface of this form is on the following picture:

Non-periodical trainings - Plan

logged: GLM

1) Record count: _____ Change

ID	Date from to	Name	Deadline	location	Tutor	shop <i>see definition</i>	Status cap. count
		?					T

pop-up window will be displayed after click - information about "Content a description of the training" from the definition

what shops is the training designated for

capacity | registered

2) Worker selection

execute back

Worker

OR

DATE from ro

topic

name

Hromadné přihlášení

Počet nalezených záznamů: 63

ID	Worker
<input type="checkbox"/>	13401
<input type="checkbox"/>	4537
<input type="checkbox"/>	12785
<input type="checkbox"/>	2486
<input type="checkbox"/>	13988
<input type="checkbox"/>	981
<input type="checkbox"/>	9289
<input type="checkbox"/>	1949
<input checked="" type="checkbox"/>	4497
<input type="checkbox"/>	3727
<input type="checkbox"/>	12244
<input type="checkbox"/>	3615
<input type="checkbox"/>	3020
<input type="checkbox"/>	4337

3)

ID	Worker	Training name	Training date from - to
xxx	Jan Novák	Toyopuc minimum	1.2. - 3.2. 2011

Picture 15 Non-periodical training terms – proposal (by author)

During the activated reservation system the list of workers (step 2) will be limited only to those workers that received inferior result from testing or have not yet attended the training.

11.1.12 Modification of Attendance sheet for print

Name	Attendance sheet print
Change type	Modification
Function	Extends the variables on the attendance sheet
Users	GLM, GL, H&S, HRD, QC, BM Project
Current process	Attendance sheet used for H&S and Shop trainings

The attendance sheet will be modified due to the different requirements for its content by BM Project. However, the modification will be designed to be applicable to all training.

Current attendance sheet includes of these columns:

Worker

ID number

Shop

Signature

New attendance sheet will include these columns (in this order):

Worker

Role (TM, TL, GL, TMM, TLM, GLM)

ID number

Shop

Shift

Signature

Notes – column empty

11.1.13 Modification of Attendance sheet entry

Name	Attendance sheet entry
Change type	Modification
Function	Customizes the attendance sheet entry for the specifics of new trainings
Users	GLM, GL, H&S, HRD, QC, BM Project
Current process	GLO attendance sheet entry (GL and H&S trainings), XLS files serve for the evaluation enter (BM Project trainings)

Modification for BM Project:

The form for the entry of attendance on the training will be amended by a new cell for the entry of evaluation. This form will be identical for both TEST and TRAINING. Final evaluation is then entered into the Maintenance skills matrix into the relevant cell (based

on the worker/group of the training). The evaluation cell should be applicable only to trainings within BM project training topic.

Modification for QC Trainings:

The form for the entry of attendance on the training will be amended by a new cell for the entry of the exact time of the training. This time will then be reflected into the all absence reports and into the Plan of rotations. This version of attendance sheet entry should be applicable only to those trainings that have selected Variable length of training in the Training type – template definition form.

Modification for system independence on ELANOR:

It will be possible to enter a record of attendance of the worker on the training he was not registered to. This new functionality will be accessible only to training administrators (not GL, GLM) and its purpose is to develop such mechanisms that would replace the necessity of ELANOR information system for administration of trainings.

11.1.14 Maintenance skills matrix

Name	Maintenance Skills Matrix
Change type	New feature
Function	Provides complete overview of the evaluated knowledge and skills of the maintenance workers within GLM's team
Users	BM Project, GLM, HRD
Current process	Information about knowledge and skills of maintenance workers are kept in separate XLS files on the network

This report will give the GLM complete overview about the level of knowledge of his workers. This matrix will displays the last result from Test or Training compounded in one Group. In the columns the information from the Training definition will be used – the Group. The Group is a halfway level between trainings topic and training itself.

The amount of trainings (groups) is firmly set. In the trainings definition it is set which shops the training relevant is for. Based on this determination the training (group) will be displayed in this matrix (clarification: even such a group that hat not yet been assigned to any worker will be displayed in the matrix). Workers will be displayed in the matrix based on the organizational structure level of the logged GLM/SV. GLM usually does not attend

these trainings (tests); therefore in case he will be displayed in the matrix, all cells of the trainings will be empty.

Always **the last result** of each training/test is displayed in the cell.

Average calculation columns at the end of the table:

- 1) “TPCA skills average“= Training/Test mandatory across TPCA (type A in definition)
- 2) “Average skills summary“= out of al Trainings/Tests (groups A+B+C in definition)
- 3) “Practice knowledge average“= Practice evaluation – data from the “Maintenance practice evaluation”
- 4) “Final evaluation“
 - a. 4.a average from 2) and 3)
 - b. 4.b final mark based on the conversion table

The order of the trainings (groups) in the matrix is based on their types (set in Training type – template definition) : A then B then C.

Visualization of the Maintenance skills matrix is on the following picture:

MAINTENANCE SKILLS MATRIX EXAMPLE
 BM Project Trainings
 GL: _____
 SHOP: _____
 Line: _____

shift	Name	ID	Role	Maintenance skill matrix - ASSY																TPCA skills average	Average skills summary	Practise knowledge average	Final evaluation		
				SENSORS	TYRE	ENGINES	SAFETY MEASURES	TOYOPUC MINIMUM	SIEMENS VOIC	TOYOPUC	MITSHUBISHI CHANGERS	DAIFUKU ASSY CONVEYORS	KAWASAKI ASSY	TIGHTENERS	MEDIA PNEU PUMPS	HYDRAULICS	FILLERS CINETIK	PRESS TO 5 tons	BEEP CONTROL				1	2	3
A	Surname Name	XXX	TLM2	80	80	80	80	80	82	82	90	85	85	85					89		80	83	78	81	3
	Surname Name	XXX	TLM1	80	80	80	80	80	82	82	82	84	84	89							80	82	82	82	3
	Surname Name	XXX	TMM3	75	75	75	75	75	90	85	78		85	76	78	84					75	79	85	82	3
	Surname Name	XXX	TMM3	75	75	75	75	75	78	78	78			76	84	83					75	77	77	77	3
	Surname Name	XXX	TMM2	70	70	70	70	70	74	74	74					80	85	85			70	75	75	75	3
	Surname Name	XXX	TMM2	70	70	70	70	70	74	74	74			75			80	78	79		70	74	87	80	4
	Surname Name	XXX	TMM1	65	65	65	65	65	69	69	69			75			80		65	69	65	68	67	68	3
	Surname Name	XXX	TMM1	65	65	65	65	65	69	69	69								68	68	65	67	76	71	3
shift average				73	73	73	73	73	77	77	77	85	81	82	81	81	82	77	69		73	76	78	77	

Number in cell = evaluation of the test of the topic

Sensors = Group
 1) Sensors_Test
 2) Sensors_Training

Picture 16 Maintenance skills matrix (by author)

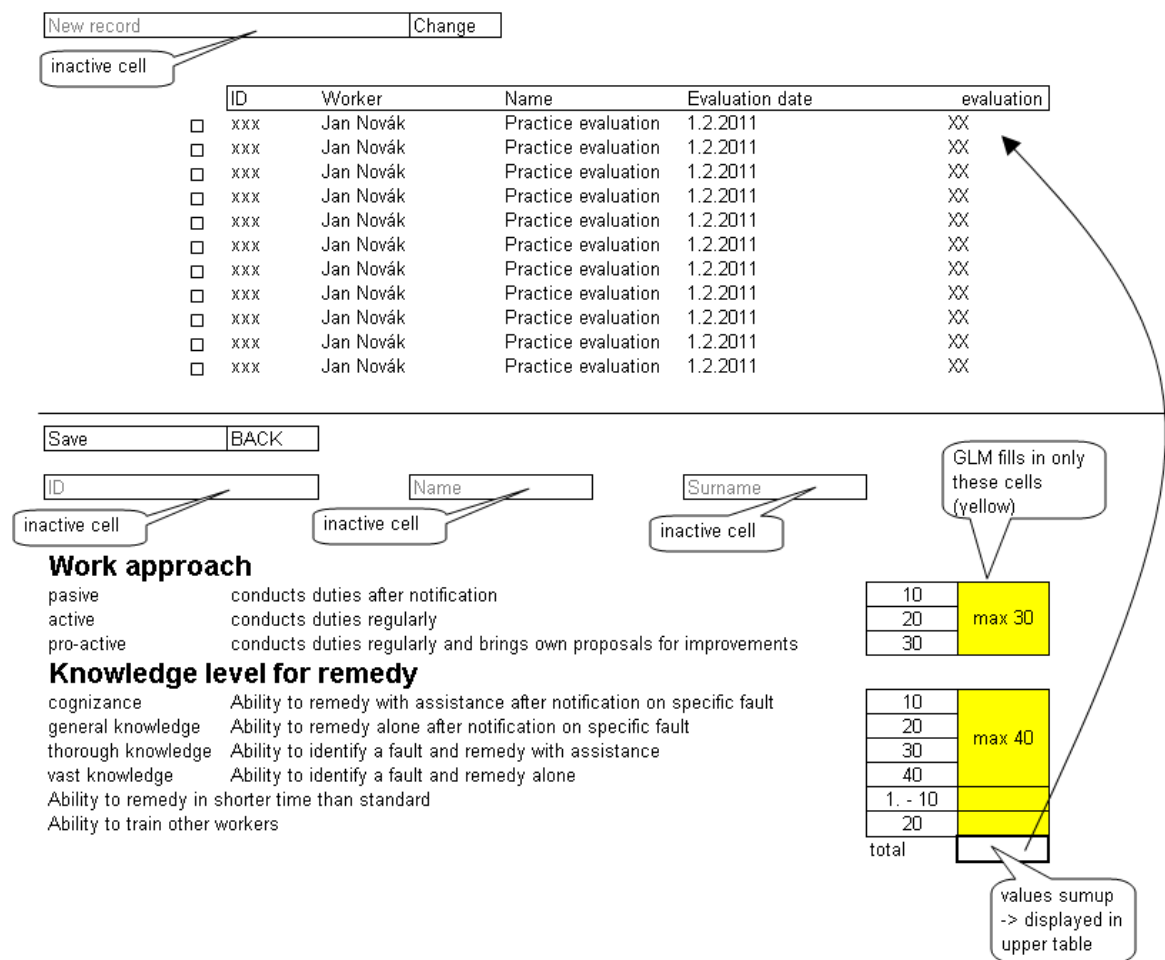
11.1.15 Maintenance practice evaluation

Name Maintenance Practice Evaluation
Change type New feature

Function	Provides standardized form of practice evaluation of the maintenance workers into the system
Users	BM Project, GLM, HRD
Current process	Practice evaluation of maintenance workers are done in separate XLS files on the network (created by HRD)

It will be applicable only for maintenance. The data can be input only by GLM for his workers through form that will be designed based on the following proposal.

Final evaluation is then displayed in the Maintenance skills matrix in the column “Practice knowledge average”.



Picture 17 Practice evaluation form (by author)

11.1.16 Conversion matrix for Body Manufacturing Project trainings

Name	Conversion matrix
Change type	New feature
Function	Provides the possibility to setup the evaluation standards for BM Project trainings

Users BM Project, GLM, HRD
Current process Information about evaluation parameters is managed by the HRD worker and kept in separate XLS file on the network

This bookmark will be located in the module Administration.

Only HRD and GL/SV BM project will have an option to alter this conversion table. GLM will have an access to this table as well but in read-only mode.

The form design proposal is on the following picture:

new record
Change

Mark for theory

	TMM1	TMM2	TMM3	TLM 1& 2
1	50	57	66	70
2	51 - 54	58 - 61	67 - 70	71 - 74
3	54 - 57	61 - 64	71 - 74	75 - 78
4	57 - 60	65 - 68	75 - 78	79 - 83
5	61	71	79	84

formatting of Maintenance skills matrix - all columns except "Practise knowledge average" and "final evaluation"

Mark for practice

	TMM1	TMM2	TMM3	TLM 1& 2
1	54	64	74	84
2	55 - 59	65 - 69	75 - 79	85 - 89
3	60 - 64	70 - 74	80 - 84	90 - 94
4	65 - 69	75 - 79	85 - 89	95 - 99
5	70	80	90	100

formatting of Maintenance skills matrix - only column "Practise knowledge average"

Final Mark

	TMM1	TMM2	TMM3	TLM 1& 2
1	49	59	69	77
2	50 - 53	60 - 63	70 - 73	78 - 81
3	54 - 59	64 - 69	74 - 79	82 - 86
4	60 - 64	70 - 74	80 - 84	87 - 91
5	65	75	85	92

formatting of Maintenance skills matrix - only Final evaluation column 4.1. and conversion to mark in column 4.2.

SAVE
BACK

Mark for theory

	TMM1	TMM2	TMM3	TLM 1& 2
1				
2				
3				
4				
5				

Here it will be possible to alter the values in tables. Primary setup is in the submission (and this example). HRD, GL/SV BM project will have an option to alter parameters in cells of each table if necessary.

Picture 18 Conversion Matrix (by author)

Any changes to the conversion matrix will not be retroactive.

11.1.17 Modification of Terms requirements report

Name Terms requirements
Change type Modification
Function Adds new filtration possibilities and information about number of workers with inferior result (BM Project)
Users H&S, BM Project, GLM, GL, QC, HRD
Current process The form displays number of workers whom a selected training expires on certain date

New column in the report Terms requirements called “Thereof below standard” will be added. The parameter below standard is set in following logic: Topic = BM Project (for other topic left empty or 0). Below standard = score from the last taken test within group is 1 or 2 (based on the conversion matrix). This information provides more effective creation of adequate number of BM Project Trainings. BM Project department workers will know exact number of workers that did not reach the standard level of technical knowledge at annual testing.

Filtration possibilities will be following:

Topic:

Training:

Date (from - to):

Shift:

11.1.18 Electric trainings

Name	Electric trainings
Change type	Modification
Function	Customizes the system in order to suit the specifics of electro trainings
Users	H&S, GLM
Current process	Electro trainings are administered by H&S workers in XLS file and ELANOR

16 individual paragraphs are currently being administered in Elanor without any relation to who/when a worker passed certain training (paragraph). This information is available only to GLs in the engagement book of their workers. In order to improve this situation in GLO these trainings will be divided into four basic groups through new form “Group definition”. In this form the user will have an option to define (create) individual groups that will then be bound with the training defined or created in the “Training type – template definition” form. The group will pose in the system in the same way a regular training does.

Electro trainings will be clustered into the groups:

- | | |
|----------------------------|--------------------------------|
| 1. Electro LV to explosion | 3. Electro LV to non-explosion |
| ELB5 - §5 | ELA5 - §5 |
| ELB6 – §6 | ELA6 - §6 |

ELB7 - §7
ELB8 - §8

ELA7 - §7
ELA8 - §8

2. Electro HV to explosion

EHB5 - §5
EHB6 - §6
EHB7 - §7
EHB8 - §8

4. Electro HV to non-explosion

EHA5 - §5
EHA6 - §6
EHA7 - §7
EHA8 - §8

LV = Low Voltage, HV = High Voltage.

In the report “Training overview” all paragraphs within group that a worker has assigned will be displayed. The passed paragraphs will be marked as “OK” in a cell and those not yet passed will be left empty. In case that a worker has not yet passed at least one of the paragraphs within the group all these paragraphs will be marked as “NG”.

11.1.19 Quality Control trainings

Name	QC trainings
Change type	Modification
Function	Customizes the system in order include QC trainings
Users	QC, GL, GLM
Current process	QC trainings are administered outside GLO

QC training topic will include these trainings: (set by QC, in “Training type – template definition” form)

- Periodical training IDL (internal driving license)
- Periodical training of torque wrench measuring
- Fitting LV and DV
- Periodical processes trainings
- Basic training with tightening pistol

Period of all these trainings is 12 months. All necessary system tools and functions for proper inclusion of these trainings into the system are already described in the previous section of the submission (Training type – template definition, Term creation etc.).

11.1.20 Human Resources Development trainings

Name	HRD trainings
Change type	Modification
Function	Customizes the system in order include HRD trainings
Users	HRD, GL, GLM, SV

Current process

HRD trainings are administered outside GLO

All necessary system tools and functions for proper inclusion of these trainings into the system are already described in the previous section of the submission (Training type – template definition, Term creation etc.). HRD trainings are both mandatory and nomination based on the role of the worker (TM, TL, GL, SV...). Mandatory trainings will be bound with the fictional workplace based on the role (xTM, xTL, xGL...). Nomination trainings will remain unbound and they will operate in the system in the same way as BM Project Trainings does -> displayed in Non-periodical trainings registration.

11.2 Module 2 – Absence

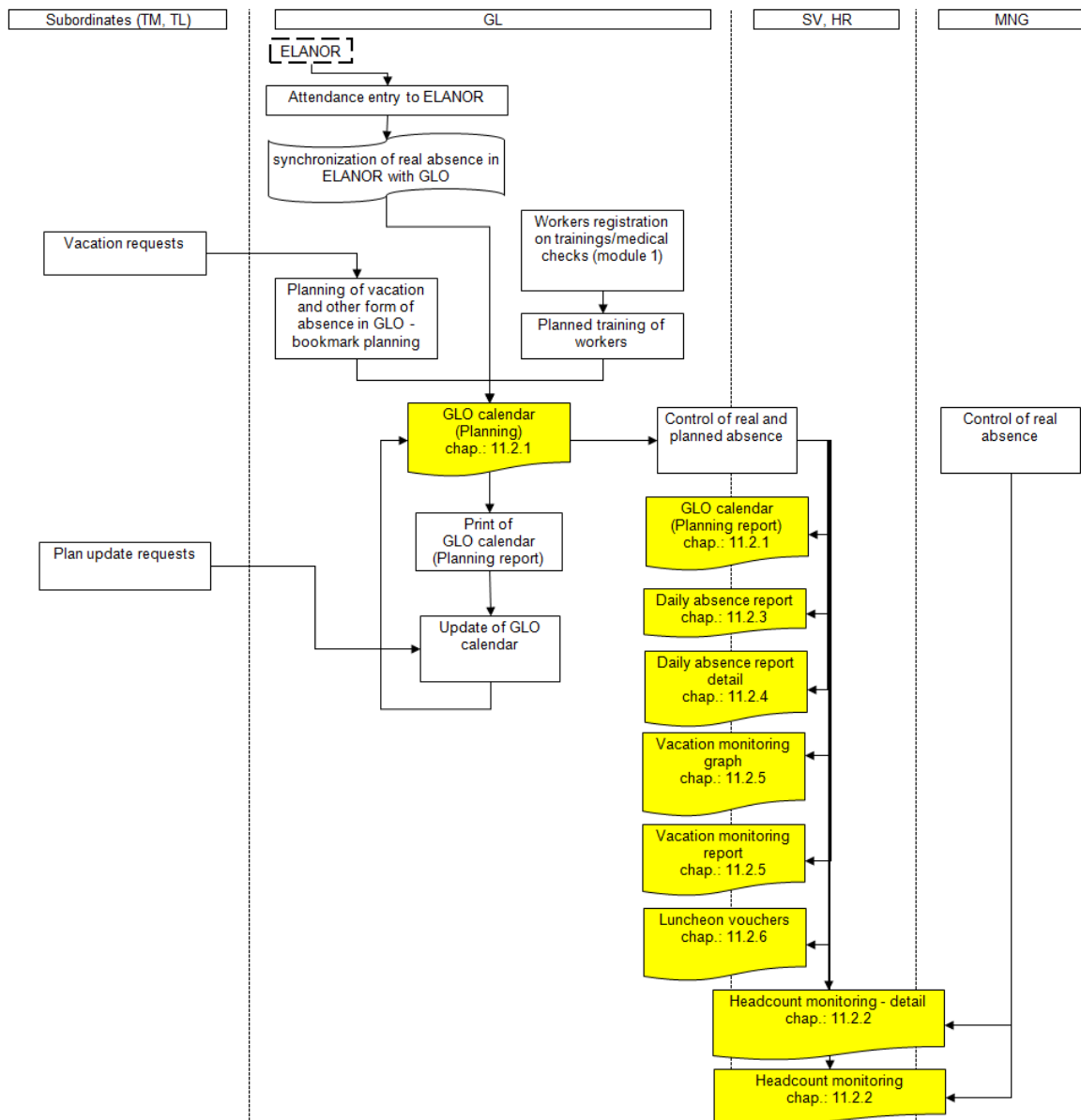
The core methodology of the module 2 for planning of vacation and other forms of absence will remain the same for the extension scope. Nevertheless, module 2 will be modified in order to meet the needs of maintenance. The maintenance specifics are as following:

Maintenance calendar

- Shifts ABCD -> calendars FA, FB, FC, FD, FR1, FR2
- Labour time 12 hours
- No shutdown or holiday leave (non-stop operation)
- Floating leave (set in ELANOR) 8 days per worker a year (further described below)
- Introduction of the compensatory leave fund
 - New column next to the column of vacation days counter
 - Further described below
 - Opening count (1st January): 0
 - Desired finishing count (31st December): 0
 - Introduction is based on the more than two days long trainings that extend into the non-working days
- Printable outputs
 - A3 format

- Half-year plan on one paper
- Layout: 1st to 3rd month on the top of the page, 4th to 6th month on the bottom of the page (see the proposed output below)
- Current report and form in GLO will be amended in order to meet the maintenance specifics (calendars complementation).

The following picture visualizes processes in module 2 after extension. Marked cells are those activities that will be modified with a reference to the chapter that describes them.



Picture 19 Planning of absence after extension (by author)

11.2.1 Modification of planning form

Name	Planning
Change type	Modification
Function	Customizes the calendar form in the system in order to suit the specifics of indirect workers
Users	GL, GLM
Current process	Indirect workers use calendar in XLS form for planning and administration of absence

The calendar will allow displaying all workers at once, based on the organizational structure without the necessity of filtration of shift (applicable also for direct workers). Example: Welding / Kaizen: GL shift “T” other workers on shifts “FA, FB, FC, FD” (Displayed in the picture below). The reason for this modification is to allow planning for all workers at one instance. (In case of filtration of one shift, only the workers from selected shift will be displayed).

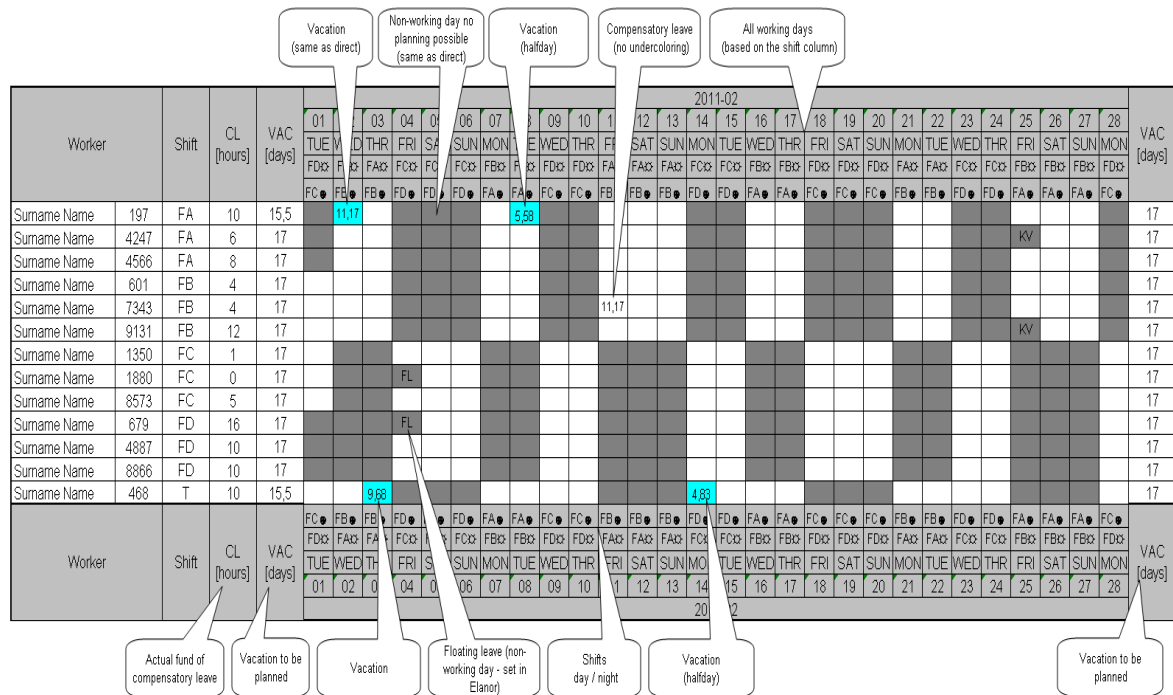
Working days in the calendar will be displayed based on the column shift. Workers will be displayed in order of their shift A -> B and alphabetically within the shift. Non-working days will be displayed in the calendar in gray color without a possibility to plan in these days (same as direct).

Display of the floating leave (FL) is a new feature in the system. Each worker within maintenance has a given code (e.g. “D13”) which is a supplementary information set in the calendar in ELANOR. It is a compensation for 12-hours working shifts. In the planning calendar this day will be displayed as “FL” without a possibility of alternation. (As it is described bellow in “Calendar for planning proposal”).

Another new feature is the information about compensatory leave fund (CL) which is also information from ELANOR. The amount of compensatory leave days (hours) is automatically reduced when planned/drawn from (similar to the vacation counter). CL can be also drawn by hours.

Working time of the maintenance is 12 hours with a 50 minutes break. Nett time is 11, 17hrs. Vacation will have the same under coloring as at direct workers.

The proposal of the modified version of the calendar is on the picture below:



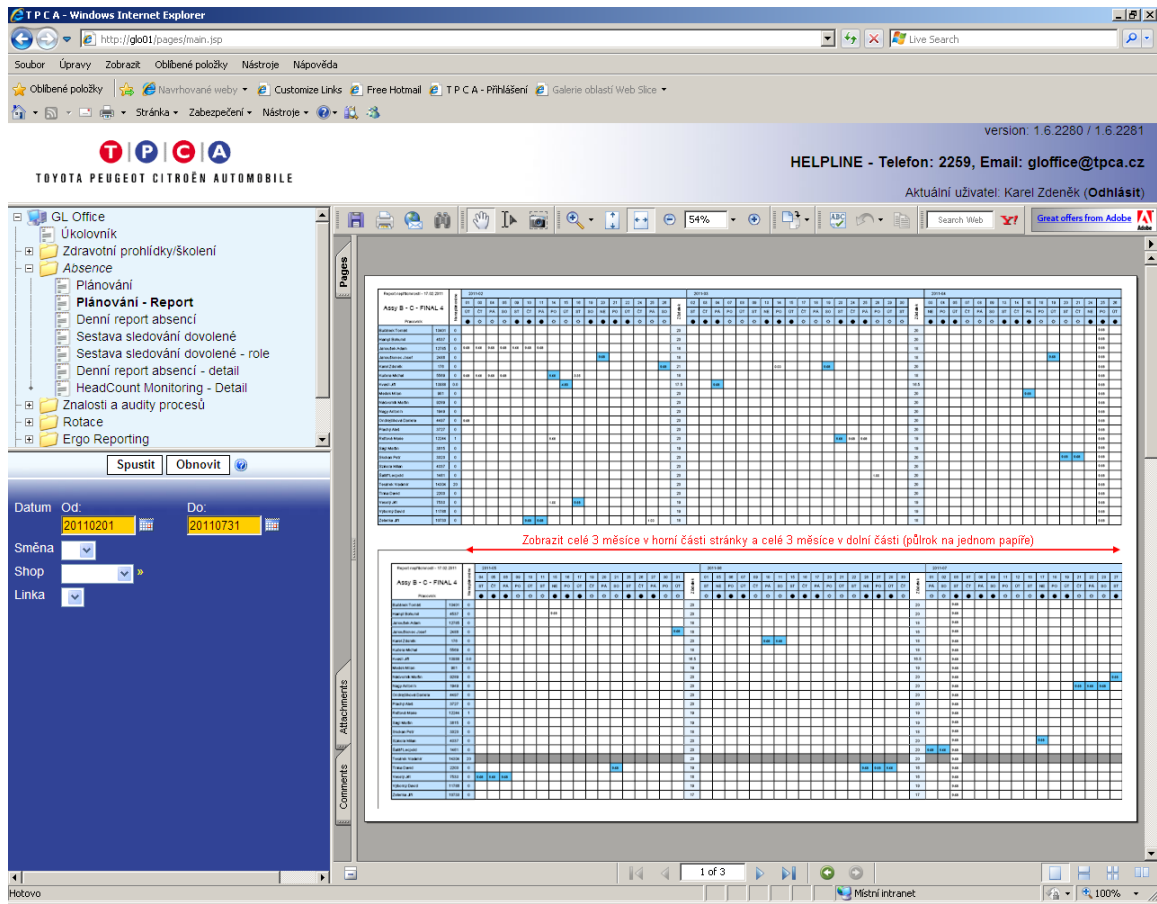
Picture 20 Planning calendar proposal (by author)

Data import from GLO to ELANOR:

Add functionality that will provide import of the absence plan of the current month in GLO to ELANOR. Synchronization with ELANOR takes place after the end of a shift. GL on the next shift than only confirms the attendance or subsequently amend it. (This would eliminate duplicate enter of attendance (= plan) into GLO and then the same data into ELANOR).

The visualization of the data in ELANOR is available in the **APENDIX**.

The proposed printable output of the calendar from the system is on the following picture:



Picture 21 Calendar printable output (by author)

11.2.2 Modification of Headcount monitoring

Name	Headcount monitoring
Change type	Modification
Function	Customizes the system in order to include indirect workers into the report
Users	GL, GLM, HR, SV, MNG, OMD
Current process	Headcount monitoring currently includes only direct workers

Only those lines with the parameter “Category: Production” will be displayed in the report (this means without maintenance). Add filter “Category” and default display Production. Automatically narrowing of the filter (parameter Category = Production) will be used. The report will only display those shops without any maintenance lines (Category = maintenance).

Regarding indirect lines (as defined in form “Line – workplace”), data will be added by the same logic as in direct lines. At the Paint shop the indirect lines have already been

established: Training paint, Investigation paint, TSG. Data will be displayed in the red highlighted section of the report (example above). At the TSG line the data will be displayed according to the maintenance calendar FA, FB, FC, FD (into the note at the top left corner “shift A” add information into the brackets about the maintenance shift e.g.: (FB). Workers with the daily calendar (1, WEB, AS, 12) and training calendar (PCT, TP) add to the day shift into the relevant rows (same as direct but only in their working days based on their calendar). This requires adding information form code list Line – MPP: GL day, TL - day, TM – day to the row No. of positions; in to the row Headcount – ELANOR add a worker to the count; to the row Attendance add the attendance. Rows Borrowed in Shift and Borrowed other will not be filled (GL from the indirect line will have a possibility to borrow worker from the direct line only by transfer of the worker through ELANOR).

10.03.2011 08:32 Směna: A
 D1 6:30 - 8:30
 • Přestávka 8:30 - 8:40
 D2 8:40 - 10:40
 Přestávka 10:40 - 10:50
 D3 10:50 - 12:50
 Přestávka 12:50 - 13:20
 D4 13:20 - 15:20
 Přestávka 15:20 - 15:30
 D5 15:30 - 17:11
 Přestávka 17:11 - 18:30

TM + 1/3 TL:		Paint			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				12	20	
82	78,3						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		5	18	82			
Headcount - Elanor		4	18	84			
Attendance		4	16	71			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		4	18	71			

TM + 1/3 TL:		Sealer			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				2	4	
17	18						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		1	3	17			
Headcount - Elanor		1	3	19			
Attendance		1	3	17			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		1	3	17			

TM + 1/3 TL:		Inspekce			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				2	4	
16	13						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		1	3	16			
Headcount - Elanor		1	3	15			
Attendance		1	3	12			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		1	3	12			

TM + 1/3 TL:		Kabiny			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				4	5	
16	17,3						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		1	5	16			
Headcount - Elanor		1	5	17			
Attendance		1	4	16			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		1	4	16			

TM + 1/3 TL:		Repair Paint			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				2	4	
15	15,3						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		1	3	15			
Headcount - Elanor		0	4	16			
Attendance		0	4	12			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		0	4	12			

TM + 1/3 TL:		Quality			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL				2	3	
18	14,7						
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions		1	4	18			
Headcount - Elanor		1	3	17			
Attendance		1	2	14			
Borrowed in Shift		0	0	0			
Borrowed other		0	0	0			
Work on Line		0	0	0			
Offline		1	2	14			

TM + 1/3 TL:		Training paint			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL						
0							
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions							
Headcount - Elanor							
Attendance							
Borrowed in Shift							
Borrowed other							
Work on Line							
Offline							

TM + 1/3 TL:		Investigation paint			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL						
5							
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions							
Headcount - Elanor							
Attendance							
Borrowed in Shift							
Borrowed other							
Work on Line							
Offline							

TM + 1/3 TL:		TSG			line mgmt:		
TM	alt.				min	real	
positions	TM+1/3TL						
0							
		direct			indirect		
		GL	TL	TM	GL	TL	TM
Nr. of positions							
Headcount - Elanor							
Attendance							
Borrowed in Shift							
Borrowed other							
Work on Line							
Offline							

Picture 22 Headcount monitoring report (by author)

11.2.3 Modification of Daily absence report

Name	Daily absence report
Change type	Modification
Function	Extends the report by indirect workers

Users All users without maintenance

Current process Statistical data source

The report will be extended in the same way as the Headcount monitoring report by indirect lines without maintenance - parameter „Category“ = production. Add filter Category and show only Production.

Add these columns into the report:

Direct line: values: Yes, No

Rotations: values: OK, NG (NG = after the shift end not all workplaces are filled).

11.2.4 Modification of Daily absence report – detail

Name Daily absence report - detail

Change type Modification

Function Filtration extension

Users GL, GLM, SV, HR

Current process Overview of workers that have an absence in selected time period

Add filtration “Category” and show Production or Maintenance based on the role of logged user automatically. (Production “Category” = Production / Maintenance “Category” = Maintenance).

11.2.5 Modification of Vacation monitoring graph and report

Name Vacation monitoring graph and report

Change type Modification

Function Filtration extension

Users GL, GLM, SV, HR

Current process Control tool for monitoring of planned absence

Add filtration “Category” and show Production or Maintenance based on the role of logged user automatically. (Production “Category” = Production / Maintenance “Category” = Maintenance).

11.2.6 Luncheon vouchers

Name Luncheon vouchers

Change type New features

Function	Monitors requirements on luncheon vouchers based on the count of non-production shifts
Users	GLM (only)
Current process	GLM monitors the requirements himself in XLS file

Every GLM will have a new bookmark in the module “Administration” available report that will show a list of his workers together with a count of luncheon vouchers that are required by them based on their attendance in ELANOR during non-production shifts. The report Food tickets will be synchronized with ELANOR every day at the same time the attendance is synchronized in GLO.

The proposed report is on the following example:

version: 1.6.2294 / 1.6.2300
HELPLINE - Telefon: 2259, Email: gloffice@tpca.cz
Aktuální uživatel: (Odhlásit)

TOYOTA PEUGEOT CITROËN AUTOMOBILE

GL Office
Úkolovník
Zdravotní prohlídky/školení
Absence
Administrace
Pracovní pozice - školení
Luncheon vouchers
Zaměstnanci - změna GL

Spustit Obnovit

Datum Od: 20110301 Do: 20110331
Směna C
Shop
Linka

Luncheon vouchers
XLS Export Tisk

Luncheon voucher for period from: 1.3.2011 to 31.3.2011

ID	Surname	Name	Count				Total worker a month
			Saturday	Sunday	Holiday	Shutdown	
86	Indrák	Tomáš	0	1	0	0	1
475	Vrátko	Pavel	0	1	0	0	1
2771	Fujera	Václav	0	1	0	0	1
862	Horčíčka	Jiri	0	1	0	0	1
794	Tvrdik	Václav	0	1	0	0	1
2954	Kuchta	Jiri	0	1	0	0	1
5940	Radil	Petr	0	1	0	0	1
716	Zelinger	Aleš	0	1	0	0	1
14297	Stejskal	Ladislav	0	1	0	0	1
3352	Štěpánek	Petr	0	1	0	0	1
13532	Vilímek	Petr	0	1	0	0	1
Luncheon voucher total							11

Responsible GL: Indrák Tomáš
Department: Welding maintenance shift FC
Signature (manager, SV)
Date: 31.3.2011

Picture 23 Luncheon vouchers (by author)

11.3 Module 3 – Audits

No system changes required. It will be used by maintenance and production indirect in case of lending a worker on the production line.

11.4 Module 6 – ESI

No system changes required. It will be used by maintenance and production indirect in case of lending a worker on the production line.

12 BENEFITS ANALYSIS

12.1 Intangible benefits

Benefits from the extension of the GLO will be primary intangible. The analysis is based on the research by Seddon [51] who divides factors that influence the final benefits that company gains from the use of information system. First, there are two pre-conditions factors that influence the benefits. These pre-conditions and activities that will fulfil them are following:

Functional fit

- Extended functionality of GLO will fully cover current off-GLO processes
- Proposed functionality is designed to enable effective and easy usage of the system
- The extension of the system does not alter current functionality of the system in any major way

Overcomming user resistance

- End users were directly involved in the submission creation
- The change management effort is strenghten by involvement of end users superiors -> support and clear statement of importance from the management
- OMD will provide sufficient amount of trainings in order to help end user to get familiar with the system (Sufficient experience with users' trainings from Phase I.)
- OMD and IS will provide complex support for the end users during systém operation

Subsequently, the benefits should be as following:

Integration

- One united database -> complex source of various data for further analysis
- Single-face output of data - standardization
- Unified and simplified communication among training organizer and attendees
 - standardized procedures for training term creation

- all trainings at one place

Process optimization

- Simplification of operation regarding training administration
 - duplicities elimination by XLS files reduction
 - automatization of routine processes (templates definition for repeated trainings)
- Improved overview of demand for BM Project trainings (instant information about inferior result from Testing)
- Improvement of BM Project training registration (reservation systém)
- System control over trainings validity -> elimination of "human failure"

Improved access to information

- Real-time data availability of complete TPCA manpower headcount
- Visualisation of previously hidden information (validity of trainings)
- Improved and standardized visualisation of information through unified outputs
- Access to information set with compliance to personal data protection (access limitation based on the role of the user)

12.2 Tangible benefits

The definition of tangible benefits of the system extension can be rather inaccurate and misleading. Due to the fact the system's purpose is to enhance and facilitate the work of Group Leader (mainly) and other users (H&S, HR manpower planning, BM Project trainings administrators, etc.) it will not bring any major costs reduction directly. The most adequate measurable variable is the administrative workload it will save once in operation. Considering that the system has not yet been implemented nor began development the workload reduction is of estimation only.

The work reduction calculation for indirect user will emanate from the evaluation analysis conducted in September 2010. This evaluation examined the workload reduction among direct GLs for each module separately. The results were following:

Table 4 Workload reduction for direct GL (by author)

Module	Average [min/month/member]						Average
	PRESS	WELD	PAINT	ASSY	ASSY LOG	QC	
1	44%	28%	82%	51%	66%	30%	54%
2	-1%	87%	76%	62%	79%	-8%	61%
3	-4%	62%	68%	63%	-22%	35%	53%
4	N/A	82%	88%	50%	-46%	3%	61%
6	98%	97%	99%	84%	100%	41%	87%
Total	49%	75%	85%	61%	29%	18%	63%

Estimated administrative workload reduction is based on the savings at direct GLs (complete evaluation is available in Appendix I). Monthly savings in hours are estimated as following:

Table 5 Estimated workload reduction for indirect Group Leaders (by author)

M1 before (hrs)	M2 before (hrs)	M1 GLO (hrs)	M2 GLO (hrs)	M1 savings (hrs)	M2 savings (hrs)	Savings total (hrs)
1,23	2,35	0,58	0,64	0,65	1,71	2,36

The company will based on this estimation manage to convert 97 hours (12 Man Day) of non-productive administrative time into productive value-adding time of indirect GLs every month.

Budget of the project is set to approx. 3 000 000 CZK (could be higher or lower, based on the price of the supplier which has not yet been stated).

Based on the expected savings and project costs the investment is estimated to return after **5 years and 6 months**. However, this information is theoretical only and should not overweight intangible benefits stated in previous chapter.

Furthermore, the use of the system should provide indirect cost reduction as a tool of risk reduction. The system will alert its user in case of invalid trainings and this information will be available not only the GL but also to his superiors. The minimization of workers with invalid training based on the system reporting can highly decrease the possible compensation or fines by legal authorities in case of an accident.

Information about GL's salary was declined by the company to publish and stated as confidential.

CONCLUSION

The thesis comes out of the literature review elaborated in the theoretical part of this work. This part is focused on the description of the issues regarding project management and the development of IS projects. Chapter 3 describes the necessity of the submission creation as a key element of any IS project and states several learning points that were then successfully implemented into the analytical and project part of this thesis.

The purpose of this work was to create a clear and detailed submission for system extension to indirect manpower in GLO. In order to do so first the analysis of administrative workflow of subjects of extension was conducted. Through thorough survey among the future users the author of this thesis investigated administrative processes that form the business point of view on this scope of work. The result of the survey were used in order to develop clear and complete overview of the processes which resulted in the creation of diagrams in chapter 8 that provide the supplier sufficient insight into the business procedures regarding the subjects of extension.

Based on the results of the analysis the system will be applicable to indirect manpower in fields of training administration (module 1), planning of absence (module 2), technical knowledge of workers in production (module 3) and recording of ESI (module 6). Modules 4 and 5 that are designed for the management of rotations on the production line will not be applicable to indirect users. While modules 1 and 2 will require necessary modification in order to be applicable to new set users modules 3 and 6 will be applicable without changes and it is expected to be used scarcely (only in case of lending indirect workers to the production line).

The modifications and new features to modules 1 and 2 form the submission for the system extension by the supplier. The submission is describes in chapter 11 in excessive manner. In module 1 to current set of trainings divided into H&S department and GLs themselves new trainings types will be added. The most demanding trainings added to the system will be BM project trainings that will require the largest interference with the system evoked by the different nature of these trainings (evaluation, non-periodicity, voluntariness). However, modification and new features to the system due to the BM Project trainings will be designed in order to fit several other new training types to the system. Alternation of the system to non-periodical trainings will be applicable also to the HRD trainings and the

introduction of the parameter Group will be used for simplification of the Electric trainings. The QC trainings will be implemented into the system with modification designed and usable at this time only for them. Furthermore, the current functionality of the system will be extended by several tools and reports available for all users. The Training report will provide an instant overview of a current status of all trainings required within GL's team, new options in filtration will be introduced in order to provide easier and simplified access to data and some features of the system will be modified in order to be available for all users of the system (trainings attendees report). One of the major changes is the introduction of the Training administrator that will provide easier management of the trainings and also serves as tool for information security thus it will be the base of limitation to access the system.

The main task of making module 2 available for indirect GLs will be the introduction of the maintenance calendar. Furthermore, the planning form will be modified in order to suit the needs of the future users (supplementary leave, floating leave, 12hrs shifts). Other reports in module 2 will be amended (new columns in reports, filtration extension) to fully cover all users of the system. The report headcount monitoring will be completed by the indirect users and it will provide real-time overview of the manpower in TPCA for the management and human resources department in order to enable more flexible movement and planning of work.

The submission as elaborated in this work provides complex overview of the proposed functionality that will amend the current system in order to be fully used by all GLs in TPCA once in operation. The concept was created in such a manner that should enable the any further possible implementation of new trainings that may occur in the future. Furthermore, such system tools were designed that will enable inclusion of the office workers into the system in the frame of trainings. This is a surplus to the initial extension task and once the office workers and relevant trainings are implemented in the system the elimination of ELANOR system regarding the trainings will be possible. All trainings in TPCA will then be managed and filed in the Group Leader Office.

The submission (although in slightly broaden version) as described in this thesis was accepted and approved by the project working group on 29th April 2011 and the supplier is expected to begin the development of the system in May 2011.

BIBLIOGRAPHY

- [1] ADEOTI-ADEKEYE, W. B. The importance of management information systems. *Library Review*. 1997, 47, 5, s. 318-328.
- [2] AJZEN, I. The Theory of Planned Behavior, *Organizational Behavior and Human Decision Processes*, 1991, 50, pp. 179-211.
- [3] ARMSTRONG, C. P., and SAMBAMURTHY, V. Information Technology Assimilation in Firms: The Influence of Senior Leadership and IT Infrastructures, *Information Systems Research*. 1999, 10, 4, pp. 304-327.
- [4] BARNEY, J. Firm Resources and Sustained Competitive Advantage, *Journal of Management*. 1991, 17, 1, pp. 99-120.
- [5] BÉBR, Richard; DOUCEK, Petr. *Informační systémy pro podporu manažerské práce*. 1. ed. Praha : Professional Publishing, 2005. pp. 223.
- [6] BENJAMIN, R. I., and LEVINSON, E. A Framework for Managing IT-Enabled Change, *Sloan Management Review*. 1993, pp. 23-33.
- [7] BHARADWAJ, A. S. A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation, *MIS Quarterly*. 2000, 24, 1, pp. 169-196.
- [8] BRIŠ, Petr. *Management kvality*. 2nd ed., uprav. Zlín : Univerzita Tomáše Bati ve Zlíně, 2010. pp. 208. ISBN 978-80-7318-912-9
- [9] CARR, D. F. 2002 [cit. 2011-03-31]. "Hershey's Sweet Victory," Baseline, December, available online at <http://www.baselinemag.com/article2/0,3959,760615,00.asp>.
- [10] DAVIDSON, J. Overcoming resistance to change. *Public Management*. 2002, 84, 11, pp. 20-23.
- [11] DAVIS G. B., OLSON M.H., *Management information systems: conceptual foundations, structure, and development (2nd ed.)*, 1984, McGraw-Hill, Inc., New York, NY, p. 718
- [12] DAY, G. The Capabilities of Market-Driven Organizations, *Journal of Marketing*. 1994, 58, 4, pp. 37-52.
- [13] EWUSI-MENSAH, K. Critical issues in abandoned information systems development projects. *Communications of the ACM*. 1997, 9, pp. 73-80.
- [14] FEENY, D. F., and WILLCOCKS, L. P. Core IS Capabilities for Exploiting Information Technology, *Sloan Management Review*. 1998, 39, 3, pp. 9-21.
- [15] FLOWERS, S. Information systems failure: identifying the critical failure factors. *Failure and Lessons Learned in Information Technology Management: An International Journal*. 1997, Vol. 1 No. 1, pp. 19-30.
- [16] FOOTE, David. *Computerworld* [online]. January 15, 2001 [cit. 2011-04-11]. The Futility of Resistance (to Change). available online at http://www.computerworld.com/s/article/56246/The_Futility_of_Resistance_to_Change_?taxonomyId=014

- [17] GRAF, D. and MISIC, M. The changing roles of the system analysts, *Journal of Information Resources Management*. 1994, Vol. 7 No. 2, pp. 15-23.
- [18] HAJKROVA, Romana. Methodology of information systems in a company's processes and organizational structure. *Economics and Management*. 2010, 15, pp. 525-529.
- [19] HARDGRAVE, B. C. and ARMSTRONG, D. J. Software process improvement: it's a journey, not a destination. *Communication of the ACM*. 2005, 48, 11, pp. 93-96
- [20] HESTERMAN, C., ANDERSON, R. P., and PANG, C. 2009. [cit. 2011-03-31] "Magic Quadrant for Midmarket and Tier 2-Oriented ERP for Product-Centric Companies," Gartner Research. available online at <<http://www.gartner.com/technology/media-Products/reprints/microsoft/vol4/article12/article12.html>>
- [21] HIRSCHHEIM, R., and NEWMAN, M. Information Systems and User Resistance: Theory and Practice, *Computer Journal*. 1988, 31, 5, pp. 398-408.
- [22] ISO/IEC 27000. *Information technology — Security techniques — Information security management systems — Overview and vocabulary*. Switzerland: International Organization for Standardization, 2009. pp. 26
- [23] JARVENPAA, S. L., and LEIDNER, D. E. An Information Company in Mexico: Extending the Resource-Based View of the Firm to a Developing Country Context, *Information Systems Research*. 1998, 9, 4, pp. 342-361.
- [24] JIANG, J.; MOTWANI, J.; MARGULIS, S. T. IS team projects: IS professionals rate six criteria for assessing effectiveness. *Team Performance Management*. 1997, 3, 4, pp. 236 - 241.
- [25] KAHNEMAN, D., and TVERSKY, A. Prospect Theory: An Analysis of Decision Under Risk, *Econometrica*. 1979, 42, 2 pp. 263-292.
- [26] LAPOINTE, L., and RIVARD, S. A Multiple Model of Resistance to Information Technology Implementation, *MIS Quarterly*. 2005, 29, 3, pp. 461-491.
- [27] LEEK, Colin. Information systems frameworks and strategy. *Industrial Management & Data Systems*. 1997, 3, pp. 86-89.
- [28] LEITEISER, R.L. MIS skills for the 1990s: a survey of MIS managers' perceptions. *Journal of Management Information Systems*. 1992, Vol. 9 No. 1, pp. 69-91.
- [29] LIEBOWITZ, J. A look at why information systems fail. *Kybernetes*. 1999, 28, 1, s. 61-67.
- [30] LIKER, Jeffrey K. *Tak to dělá Toyota : 14 zásad řízení největšího světového výrobce*. Praha : Management Press, 2007. 390 s. ISBN 978-80-7261-173-7.
- [31] MARAKAS, G. M., and HORNIK, S. Passive Resistance Misuse: Overt Support and Covert Recalcitrance in IS Implementation, *European Journal of Information Systems*. 1996, 5, 3, pp. 208-219.
- [32] MARCHEWKA, Jack T. *Information Technology Project Management*. 2008, Wiley, pp. 544

- [33] MARKUS, M.L. and KEIL, M. If we build it, they will come: designing information systems that people want to use. *Sloan Management Review*. 1994, MIT, Summer, pp. 11-25.
- [34] MARKUS, M.L. Power, politics, and MIS implementation, *Communication of the ACM*. 1983, Vol. 26 No. 6, pp. 430-444.
- [35] MARTINKO, M. J., HENRY, J. W., and ZMUD, R. W. An Attributional Explanation of Individual Resistance to the Introduction of Information Technologies in the Workplace, *Behavior & Information Technology*. 1996, 15, 5, pp. 313-330.
- [36] MATA, F. J., FUERST, W. L., and BARNEY, J. B. Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis, *MIS Quarterly*. 1995, 19, 4, pp. 487-505.
- [37] MCGRATH, R. G., MACMILLAN, I. C., and VENKATARAMAN, S. Defining and Developing Competence: A Strategic Process Paradigm, *Strategic Management Journal*, 1995, 16, pp. 251-275.
- [38] PEARLSON, Keri E.; SAUNDERS, Carol S. *Managing and Using Information Systems*. 3rd. 2005, Wiley, pp. 384
- [39] PEPPARD, J., *IT Strategy for Business*, 1993. Pitman Publishing, London, 306 pp
- [40] PORTER, M. *Competitive Advantage*, 1985, The Free Press, New York.
- [41] RAMILLER, N. C., SWANSON, E. B., and WANG, P. Research Directions in Information Systems: Toward an Institutional Ecology, *Journal of the Association for Information Systems*. 2008, 9, 1, pp. 1-22.
- [42] REICH, B. H., and BENBASAT, I. Measuring the Linkage between and Information Technology Objectives, *MIS Quarterly*. 1996, 20, 1, pp. 55-81.
- [43] REILLY, K. 2005. "AMR Research Reports Oracle-PeopleSoft Merger Could Result in a \$5.5 Billion Applications Business," AMR Research, January 18.
- [44] REK, Pavel. *ERPForum* [online]. January 10, 2010 [cit. 2011-04-11]. Jak správně definovat firemní požadavky na informační systém. available online at <<http://www.erpforum.cz/krok-za-krokem-erp/jak-spravne-definovat-firemni-pozadavky-na-informacni-system-serial-i-2dil.html>>
- [45] ROSENAU Jr, MILTON D. *Řízení projektů*. 2003. Brno: Computer Press, 344 pp
- [46] ROSS, J. W., BEATH, C. M., and GOODHUE, D. L. Develop Long-term Competitiveness Through IT Assets, *Sloan Management Review*, 1996, 38, 1, pp. 31-42.
- [47] SAMUELSON, W., and ZECKHAUSER, R. Status Quo Bias in Decision Making, *Journal of Risk and Uncertainty*. 1988, 1, pp. 7-59.
- [48] SCHAULAND, D., *Wisegeek* [online]. 2011 [cit. 2011-03-23]. What Are Management Information Systems?. available online at : <<http://www.wisegeek.com/what-are-management-information-systems.htm>>.
- [49] SCHWALBE, K. *Information Technology Project Management*. 2000, Course Technology, Cambridge, pp. 512

- [50] SCOTT, J. E. 1999. "The FoxMeyer Drugs' Bankruptcy: Was it a Failure of ERP?," in Proceedings of the Fifth Americas Conference on Information Systems, Milwaukee, WI, pp. 223-225.
- [51] SEDDON, P. B., et al. A multi-project model of key factors affecting organizational benefits from enterprise systems. *MIS Quarterly*. 2010, 34, pp. 305-328.
- [52] SODOMKA, P., *Informační systémy v podnikové praxi*, 2006, Computer Press, Brno, 352 pp, ISBN 80-251-1200-4.
- [53] SUBRAMANIAN, G.B. et al. Balancing four factors in system development projects. *Communication of the ACM*. 2009, 52, 10, pp. 118 – 121
- [54] TALLON, P. P. Understanding the Dynamics of Information Management Costs. *Communications of the acm*. 2010, 53, 3, P. 121-125.
- [55] TPCA Czech s.r.o. *Tpca.cz* [online]. 2006 [cit. 2011-04-30]. Toyota Peugeot Citroën Automobile. Available at WWW: <www.tpca.cz>.
- [56] VERMA, Vijay K. *Project Management Handbook*. San Francisco: Jossey-Bass, 1998. Conflict Management, pp. 401-425.
- [57] WADE, M; HULLANS, J. The resource-based view and information systems research: review, extension, and suggestions for further research. *MIS Quarterly*. 2004, 28, 1, s. 107-142.
- [58] ZAHEER, A., and ZAHEER, S. Catching the Wave: Alertness, Responsiveness, and Market Influence in Global Electronic Networks, *Management Science*. 1997, 43, 11, pp. 1493-1509.

LIST OF ABBREVIATIONS

BM	Body manufacturing
ERP	Enterprise Resource Planning
ESI	Early symptom indicator
GL	Group Leader
GLM	Group Leader Maintenance
GLO	Group Leader Office
H&S	Health and safety
HRD	Human resources development
IS	Information system
ISMS	Information security management system
IT	Information Technology
MIS	Management Information System
MNG	Manager
OMD	Operational Management Development
PI	Production indirect
QC	Quality control
SV	Supervisor
TL	Team leader
TLM	Team leader maintenance
TM	Team member
TMM	Team member maintenance
TPCA	Toyota Peugeot Citroën Automobile

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APPENDICES

P I Phase one evaluation

P II Documents within indirect manpower examples

P III Workplace and trainings assignment after extension for H&S trainings

APPENDIX P I: PHASE ONE EVALUATION

EVALUATION OF ADMINISTRATION WORKLOAD SAVING BY IMPLEMENTATION OF GLO SYSTEM (only GL role)

Summary by module & shop

BEFORE IMPLEMENTATION

Modul	Average [min/month/member]							Average [MD/YEAR - (102 GL)]
	PRESS	WELD	PAINT	ASSY	ASSY LOG	QC	Avg	
1	48	71	159	53	32	100	74	195
2	76	143	178	148	72	187	141	371
3	327	380	194	339	126	175	287	753
4	0	561	708	483	142	363	455	1195
6	439	157	229	201	173	289	213	559
Total	890	1311	1468	1223	545	1114	1171	3074

AFTER GLO IMPLEMENTATION

Modul	Average [min/month/member]							Average [MD/YEAR - (102 GL)]
	PRESS	WELD	PAINT	ASSY	ASSY LOG	QC	Avg	
1	27	51	29	26	11	70	35	91
2	76	19	43	56	15	202	55	143
3	340	145	63	125	154	113	136	356
4	0	103	84	241	208	352	177	465
6	8	5	3	31	1	170	28	74
Total	452	323	221	480	388	908	430	1129

SAVING

Modul	Average [min/month/member]							Average [MD/YEAR - (102 GL)]
	PRESS	WELD	PAINT	ASSY	ASSY LOG	QC	Avg	
1	21	20	130	27	21	30	40	105
2	-1	124	135	92	57	-15	87	228
3	-13	235	131	214	-28	62	151	397
4	0	458	624	242	-66	10	278	730
6	431	152	226	169	172	119	185	485
Total	439	988	1247	744	157	206	741	1945
hour/month/member	7,3	16,5	20,8	12,4	2,6	3,4	12,3	
hour/shift/member	0,4	1,0	1,2	0,7	0,2	0,2	0,7	
Number of users (GL)	6	24	15	36	12	9	102	

SAVING [%]

Modul	Average [min/month/member]							Average [MD/YEAR - (102 GL)]
	PRESS	WELD	PAINT	ASSY	ASSY LOG	QC	Avg	
1	44%	28%	82%	51%	66%	30%	54%	54%
2	-1%	87%	76%	62%	79%	-8%	61%	61%
3	-4%	62%	68%	63%	-22%	35%	53%	53%
4	#DIV/0!	82%	88%	50%	-46%	3%	61%	61%
6	98%	97%	99%	84%	100%	41%	87%	87%
Total	49%	75%	85%	61%	29%	18%	63%	63%

=> Administration workload saving forecast

Position	ALL	SV	GL	ERGO	AS	HR
Benefit (MD/YEAR)	2836	127	2449	65	51	144

Forecasted saving 2449 MD/YEAR

GAP: 504 MD/YEAR (21%)

ADDITIONAL BENEFITS: STANDARDISATION OF GL'S WORK
IMPROVEMENT OF DATA QUALITY
HISTORY DB

BM Project trainings registration file

PŘIHLÁŠENÍ K TRÉNINKU MAITENANCE PRVNÍ Q. 2011														
P.c	Datum		Čas	Název školení	délka školení	místo	škrouitel	Školení pro tyto oddělení			Přihlásit do	Prezentace	Počet přihlášených	Účast na školení
	OD	DO						Press	Weld	Paint				
1.	3.1.	4.1.	8:00-15:30	Základní a pokročilé školení údržby	2	Učebna - BM	BM				20.12.2010	Přihlásit	1	0
2.	3.1.	6.1.	8:00-15:30	TOYOPUC základy	4	Učebna - BM	BM				20.12.2010	Přihlásit	1	1
3.	7.1.	7.1.	8:00-15:30	EISENMANN dopravníky - welding	1	Učebna - BM	BM				21.12.2010	Přihlásit	0	0
4.	10.1.	12.1.	8:00-15:30	TOYOPUC pokročilý	3	Učebna - BM	Kroutil				1.1.2011	Přihlásit	0	0
5.	10.1.	14.1.	8:00-15:30	S7 Program - ZÁKLADNÍ	5	Sídat	Sídat				23.12.2010	Přihlásit	4	4
6.	13.1.	14.1.	8:00-15:30	Základy pneumatika	2	Učebna - BM					1.1.2011	Přihlásit	6	6
7.	17.1.	20.1.	8:00-15:30	Robot KAWASAKI základy	4	Učebna - BM	BM				1.1.2011	Přihlásit	1	1
8.	21.1.	21.1.	8:00-15:30	Převodové motory	1	Učebna - BM	BM				10.1.2011	Přihlásit	9	9
9.	24.1.	25.1.	8:00-15:30	Dopravníky DAIFUKU	2	Učebna - BM	Kroutil				10.1.2011	Přihlásit	8	7
10.	26.1.	27.1.	8:00-15:30	MITSHUBISHI měniče	2	Učebna - BM	BM				11.1.2011	Přihlásit	8	8
11.	28.1.	28.1.	8:00-15:30	Zavážení dílu automatickým systémem AGV	0,5	Učebna - BM	BM				12.1.2011	Přihlásit	10	10
12.	31.1.	4.2.	8:00-15:30	S7 Program - POKROČILÝ	5	Sídat	Sídat				10.1.2011	Přihlásit	3	3
13.	Bude upřesněno		8:00-15:30	BEP CONTROL	4	Assembly	Svoboda				15.1.2011	Přihlásit	2	0
14.	Bude upřesněno		8:00-15:30	SIEMENS HW + diagnostika ASSY	2	Učebna - BM	Sídat				15.1.2011	Přihlásit	2	0
15.	Bude upřesněno	Asi do 28.2.	8:00-15:30	Cinetic - plicní zařízení provozních kapalin	4	Francie	Dodavatel					Přihlásit	4	0
16.	7.2.	8.2.	8:00-15:30	DAIFUKU SCREENWORKS	2	Učebna - BM	BM/Kroutil				20.1.2011	Přihlásit	5	5
17.	9.2.	9.2.	8:00-15:30	TOYOPUC CPU	1	Učebna - BM	BM				20.1.2011	Přihlásit	3	3
18.	10.2.	10.2.	8:00-15:00	Senzory	1	GREEN	BM				1.2.2011	Přihlásit	8	8
19.	11.2.	11.2.	8:30-14:00	Maximo	0,5	BORDO	BM				1.2.2011	Přihlásit	0	0
20.	14.2.	17.2.	8:00-15:30	TOYOPUC základy	4	Učebna - BM	BM				1.2.2011	Přihlásit	6	6
21.	Bude upřesněno		8:00-15:30	Roboti KAWASAKI Paint	4	Paint	Kawasaki				20.1.2011	Přihlásit	3	0
22.	18.2.	18.2.	8:00-15:30	Obara Svářecí technika	1	Učebna - BM	BM				1.2.2011	Přihlásit	3	3
23.	21.2.	22.2.	8:00-15:30	SIEMENS HW + diagnostika	2	Učebna - BM	Sídat				1.2.2011	Přihlásit	6	6
24.	22.2.	23.2.	8:00-15:30	Manipulace materiálem v lisovacích formách NACHI	2 x 1	Press	Dodavatel				1.2.2011	Přihlásit	0	0
25.	23.2.	24.2.	8:00-15:30	MITSHUBISHI měniče	2	Učebna - BM	BM				10.2.2011	Přihlásit	8	8
26.	25.3.	25.3.	8:00-12:00	Safety Shinwa	0,5	Učebna - BM	BM				10.2.2011	Přihlásit	3	0
27.	28.3.	28.3.	8:00-15:30	TOYOPUC - SFC / FB	1	Učebna - BM	BM				10.2.2011	Přihlásit	6	0
28.	30.3.	30.3.	8:00-15:30	AGV	0,5	Učebna - BM	BM				10.2.2011	Přihlásit	0	0
29.	3.2.	3.2.	7:30-19:30	Pneumatika - Indrák	1	Učebna - BM	Krajčiček					Přihlásit	5	0
30.	31.1.	31.1.	7:30-19:30	Školení bezpečnosti strojních zařízení	1	Učebna - BM	Rockwell					Přihlásit	10	0
31.	8.11.	8.11.	7:30-19:30	Zavážení dílu automatickým systémem AGV		Učebna - BM	BM					Přihlásit	10	0
32.	10.1.	10.1.	7:30-19:30	Zavážení dílu automatickým systémem AGV		Učebna - BM	BM					Přihlásit	8	0
33.	31.1.	31.1.	7:30-19:30	Školení bezpečnosti strojních zařízení	1	Učebna - BM	Rockwell					Přihlásit	5	0
34.	14.3.2011	15.3.2011	9:00-16:00	Profibus Assembly 1/2	2	602	SIDAT					Přihlásit	0	0
35.	23.3.2011	24.3.2011	9:00-16:00	Profibus Assembly 1/2	2	Učebna - BM	SIDAT					Přihlásit	0	0
36.												Přihlásit	0	0
Celkem												148	88	
školení provádí BM												Můžeš vyplňovat	Nevyplňuj - je po termínu, nebo plno.	
školení provádí Externí firma														

BM Project attendance sheet/registration file

NÁVRAT													
Profibus Assembly 1/2													
P.č.	Jméno	Příjmení	osobní číslo	shop	oddělení	sekce	pozice	směna	23.3		24.3		
									podpis		podpis	Test	
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
Dodavatel tréninku				kontaktní osoba				Telefon	kontak		Teorie hod.	Praxe hod.	
SIDAT													

Já výše podepsaný jsem byl poučen a dodržování bezpečnosti práce v prostorách BM projektu a Svařovny a o specifických podmínkách při práci na zkušebních kitech.

APPENDIX P III: WORKPLACE AND TRAININGS ASSIGNMENT AFTER EXTENSION FOR H&S TRAININGS

Maintenance						
Department	SHOP	Linka	Fiktivní pracoviště (pro potřeby školení)	Školení na pracovišti		
Body Manufacturing	Press	Press Mnt.	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřizené Referenční zkoušky CHL - EXTRA nebezpečné		
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Referenční zkoušky Chemické látky extra nebezpečné pro TM, TL		
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL		
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované		
			xElektro NN do nevybuchu (skupina)	ELA5 - §6 ELA6 - §6 ELA7 - §7 ELA8 - §8		
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač		
			Plošiny	MEWP1 - Plošiny teorie MEWP2 - Plošiny zkouška LMXR - Plošiny opakované		
			Obsluha tlakových nádob	Obsluha tlakových nádob		
			ZP 311 - Plamenové sváření (autogen)	ZP 311 - Plamenové sváření (autogen)		
			ZK 311 - Plamenové sváření (autogen)	ZK 311 - Plamenové sváření (autogen)		
			ZP 111 - Obloukové svařování obalovanou elektrodou	ZP 111 - Obloukové svařování obalovanou elektrodou		
			ZK 111 - Obloukové svařování obalovanou elektrodou	ZK 111 - Obloukové svařování obalovanou elektrodou		
			ZP 135 - Obloukové svařování tavicí se elektrodou	ZP 135 - Obloukové svařování tavicí se elektrodou		
			ZK 135 - Obloukové svařování tavicí se elektrodou	ZK 135 - Obloukové svařování tavicí se elektrodou		
			ZP 141 - Obloukové svařování (WIG, TIG)	ZP 141 - Obloukové svařování (WIG, TIG)		
			ZK 141 - Obloukové svařování (WIG, TIG)	ZK 141 - Obloukové svařování (WIG, TIG)		
			ZP 15.2 - Dělení materiálu plazmou	ZP 15.2 - Dělení materiálu plazmou		
			ZK 15.2 - Dělení materiálu plazmou	ZK 15.2 - Dělení materiálu plazmou		
	Weld Eng.	Weld Mnt.	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřizené		
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL		
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL		
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované		
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač		
			Plošiny	MEWP1 - Plošiny teorie MEWP2 - Plošiny zkouška LMXR - Plošiny opakované		
			xElektro NN do nevybuchu (skupina)	ELA5 - §6 ELA6 - §6 ELA7 - §7 ELA8 - §8		
			Obsluha tlakových nádob	Obsluhy tlakových nádob		
			Obsluha plyn. zařízení - středotlak	Obsluha plyn. zařízení - středotlak		
			Referenční zkoušky	Referenční zkoušky		
			ZP 311 - Plamenové sváření (autogen)			
			ZP 135 - Obloukové svařování tavicí se elektrodou			
			ZP 21-9 - Sváření bodové odporové			
			ZP 15.2 - Dělení materiálu plazmou			
			BM Project Mnt.	BM Project Mnt.	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřizené
					xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
					xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
					Referenční zkoušky	Referenční zkoušky
xElektro NN do nevybuchu (skupina)	ELA5 - §6 ELA6 - §6 ELA7 - §7 ELA8 - §8					

Paint	Paint Eng.	Paint Mnt.	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřízené Referenční zkoušky CHL - extra nebezpečné
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			Obsluha tlakových nádob	Obsluhy tlakových nádob
			Obsluha plyn. zařízení - středotlak	Obsluha plyn. zařízení - středotlak
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač
			Jeřáb / vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované
			Elektro NN do výbuchu	ELB5 - \$5 ELB6 - \$6 ELB7 - \$7 ELB8 - \$8
			Elektro NN do nevýbuchu	ELA5 - \$5 ELA6 - \$6 ELA7 - \$7 ELA8 - \$8
			ZK 111 - Obloukové svařování obalovanou elektrodou	ZK 111 - Obloukové svařování obalovanou elektrodou
			ZK 135 - Obloukové svařování tavicí se elektrodou	ZK 135 - Obloukové svařování tavicí se elektrodou
			Plošiny	MEWP1 - Plošiny teorie MEWP2 - Plošiny zkouška LMXR - Plošiny opakované
			xGLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			ZK 111 - Obloukové svařování obalovanou elektrodou	ZK 111 - Obloukové svařování obalovanou elektrodou
			ZK 135 - Obloukové svařování tavicí se elektrodou	ZK 135 - Obloukové svařování tavicí se elektrodou
ZK 311 - Plamenové sváření (autogen)	ZK 311 - Plamenové sváření (autogen)			
ZP 111 - Obloukové svařování obalovanou elektrodou	ZP 111 - Obloukové svařování obalovanou elektrodou			
ZP 135 - Obloukové svařování tavicí se elektrodou	ZP 135 - Obloukové svařování tavicí se elektrodou			
ZP 311 - Plamenové sváření (autogen)	ZP 311 - Plamenové sváření (autogen)			
Obsluha tlakových nádob	Obsluha tlakových nádob			
Obsluha plyn. zařízení - středotlak	Obsluha plyn. zařízení - středotlak			
Plynová zařízení - montáž a opravy	Plynová zařízení - montáž a opravy			
Plošiny	MEWP1 - Plošiny teorie MEWP2 - Plošiny zkouška LMXR - Plošiny opakované			
xElektro NN do výbuchu (skupina)	ELB5 - \$5 ELB6 - \$6 ELB7 - \$7 ELB8 - \$8			
Vysokozdvih, tahač	FP1 - VZV teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač			
Jeřáb / vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované			
Referenční zkoušky				

Production Control	Facility	Facility	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřizené Referenční zkoušky CHL - extra nebezpečné
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované
			xElektro VN do výbuchu (skupina)	EHB5 - §5 EHB6 - §6 EHB7 - §7 EHB8 - §8
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač
			Plošiny	MEWP1 - Plošiny teorie MEWP2 - Plošiny zkouška LMXR - Plošiny opakované
			Obsluha tlakových nádob	PVXX - Obsluha tlakových nádob
			Obsluha nízkotlakých kotlů	PBLP - Obsluha nízkotlakých kotlů
			GEMX - Obsluha ply. zařízení - středotlak	GEMX - Obsluha ply. zařízení - středotlak
			Referenční zkoušky	Ref_zk - Referenční zkoušky
			ZP 311 - Plamenové sváření (autogen)	ZP 311 - Plamenové sváření (autogen)
			ZK 311 - Plamenové sváření (autogen)	ZK 311 - Plamenové sváření (autogen)
			ZP 111 - Obloukové svařování obalovanou elektrodou	ZP 111 - Obloukové svařování obalovanou elektrodou
			ZK 111 - Obloukové svařování obalovanou elektrodou	ZK 111 - Obloukové svařování obalovanou elektrodou
			ZP 141 - Obloukové svařování (WIG, TIG)	ZP 141 - Obloukové svařování (WIG, TIG)
			ZK 141 - Obloukové svařování (WIG, TIG)	ZK 141 - Obloukové svařování (WIG, TIG)

Production Indirect				
Department	SHOP	Linka	Fiktivní pracoviště (pro potřeby školení)	Školení na pracovišti
Body Manufacturing	Welding	Kaizen	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřízené Referenční zkoušky
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Referenční zkoušky
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška TM1 - Tahač teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač
			ZP 15.2 - Dělení materiálu plazmou	
			ZP 21-9 - Sváření bodové odporové	
			ZK 311 - Plamenové sváření (autogen)	
			ZK 111 - Obloukové sváření obalovanou elektrodou	
			ZK 135 - Obloukové sváření tavicí se elektrodou	
		ZK 141 - Obloukové sváření (WIG, TIG)		
		ČSN 141		
		ČSN 111	Na toto svareni budeme zavadet do Elanoru nový termin, nebude se imenovat WAKR jako na ostatni svareni!!!	
		ČSN 135		
		CMM	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřízené Referenční zkoušky
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška TM1 - Tahač teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač
			Obsluha tlakových nádob	Obsluha tlakových nádob
Paint	Paint	TSG	xGLM	PP - 1 - Periodická roční BOZP+PO - GL, SV ENV - Environmental školení pro nadřízené CHL - eztra nebezpečné
			xTLM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			xTMM	PP - 1 - Periodická roční BOZP dle platné osnovy pro TM a TL Enviro dle platné osnovy pro TM a TL Chemické látky extra nebezpečné pro TM, TL
			xJeřáb / Vazač	COBBT - Jeřáb O Vazač B teorie COBBE - Jeřáb O Vazač B zkouška CBAR - Jeřáb, vazač opakované
			Vysokozdvih, tahač	FP1 - VZV teorie + zkouška TM1 - Tahač teorie + zkouška DFTR - Opakované školení - vysokozdvih, tahač