The new electronic report of noise-exposure-measurements and audiometric-examinations in the AUVA

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Introduction

The AUVA is the Austrian Social Insurance for Occupational Risks for approximately 3 million employed persons and 1.3 million school children and students. The insurance cares for about 180.000 victims of occupational accidents and diseases annually. About 300.000 persons involved in accidents of all kinds are treated in own trauma centers and rehabilitation centers every year. The AUVA pays about 73.000 compensations per year to victims of occupational accidents and diseases or their families. Therefore, a central motivation is the prevention of occupational accidents and diseases.

One major element of the prevention activities are the visits of prevention workers (experts in a specific domain, e.g. noise control) in companies, to suggest them possibilities to improve the employees' safety and health conditions at their workplaces. In the regular case, visits of prevention workers are demanded by a company, when a new manufacturing system has been installed and the company wants e.g. measurements of the resulting new noise level in the construction hall. Moreover the AUVA is bound by law to serve companies all over the country in this regard. To be able to fulfill this responsibility, the AUVA with its headquarters in Vienna, has four further offices, each responsible for one or more provinces.

Motivation

Knowledge moves in the field of knowledge preservation, knowledge division and knowledge search. In order to master these tasks optimally, information management systems in the prevention of occupational accidents and diseases become more and more important.

Figure 1: Information management

Knowledge for a consulting company such as the prevention departments of the AUVA is the article of trade. Analyzing of incoming data and outgoing knowledge is one of the most important skills to become more efficient in daily work and for strategic orientation. To fulfill the abovementioned obligation, and to further increase the number of served companies, AUVA seeks to improve its business processes of ordering and documentation of the company visits. An internal aim is to visit all served companies in regular intervals. As the number of prevention field workers is limited, it is challenging for this to stick to a decided period. To guarantee the satisfaction of served companies and common quality-standards of support, also the other AUVA prevention departments need to improve their processes.

The goal of the AUVA for the project described herein, is to provide software support for work processes in the 'prevention' domain. The core prevention processes, which are slightly different in the single offices are unified on a best practices act as template for a standardized process basis. This means that there have been drafts for process unification suggested by the headquarters, however, well-established processes in different offices were also welcome as basis for improvements.

Methods

A major requirement of the AUVA has been that the developed software represents a significant assistance for the users and to require additional workload from them. A simplification of daily tasks for prevention workers has been communicated as an overall aim. Based on this requirement, after an evaluation of the suitability of available enterprise systems software also with a focus on customization possibilities, it was decided to develop a new system satisfying the special needs of the customer. Especially, a user-centered approach with ongoing interaction and short feedback cycles to align the supporting system on the stakeholders' needs has been identified as paramount.
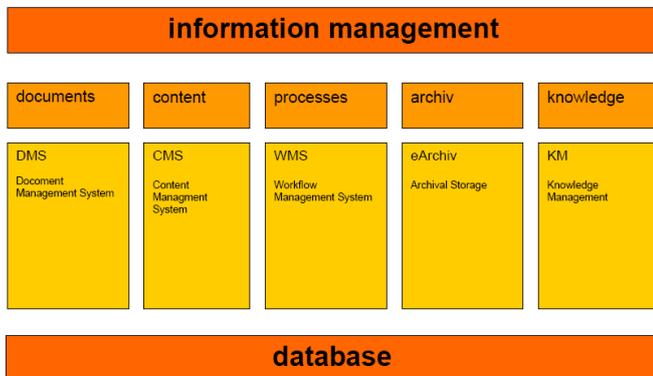
Description of noise and audiometric report

Both reports are the first expert processes which can be transacted in the document managing software "EPOS". The activities are embedded in bigger processes where requests e.g. of support and consulting activities to different areas of the prevention-working can be applied. While executing these tasks important data and documents are generated and stored.

The screen window of the noise-exposure report is divided into 3 areas. In the lower left part it is possible to enter the results of the sound pressure measurements, name of the measuring point, the equivalent continuous A-weighted

sound pressure level and the C-weighted peak value of sound pressure, all in decibels. In the area above the groups of evaluation are entered with the number of employees, that belong to this group. By generating a group, a column is produced to the left side of the table with the measuring points where it possible to enter times of the exposition.

Figure 2: Sound pressure level measurement

The noise exposition level for every group is calculated from the exposition times and the exposition level and then displayed in the table above. These values are automatically compared with the release value (80 dB) and the limit value (85 dB) to mark these levels fat or red and fat. From these entries a standardised noise measuring report is generated as Word-document, with inside standing how many persons are noise-exposed and must be submitted to an audiometric investigation. Further the results of the sound pressure measurement are displayed.

Figure 3: List of evaluation-groups in audiometric report

The only task of the sound pressure measurements is to select the person's groups, which are noise-exposed and must be submitted to an audiometric investigation. If the noise measurement report has been generated there is a possibility to indicate that the audiometric investigation is to be accomplished by the AUVA. By entering with "yes" an activity knot is produced automatically. If one changes now to the activity knots of the appropriate audiometric investigation, the groups of evaluations with the associated noise exposure levels are displayed. Usually the audiometric investigation follows immediately after the sound level measurement.
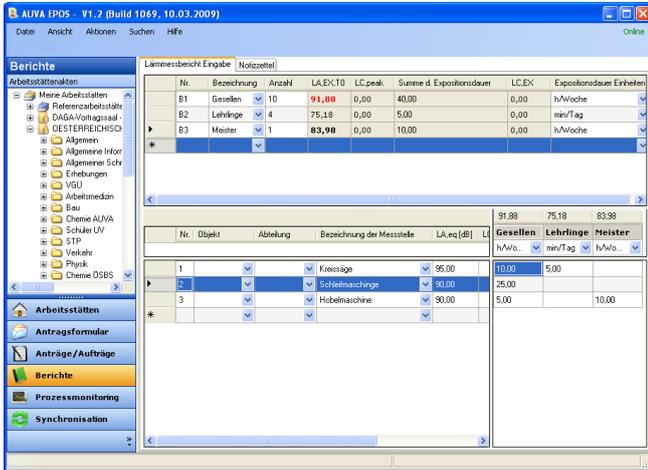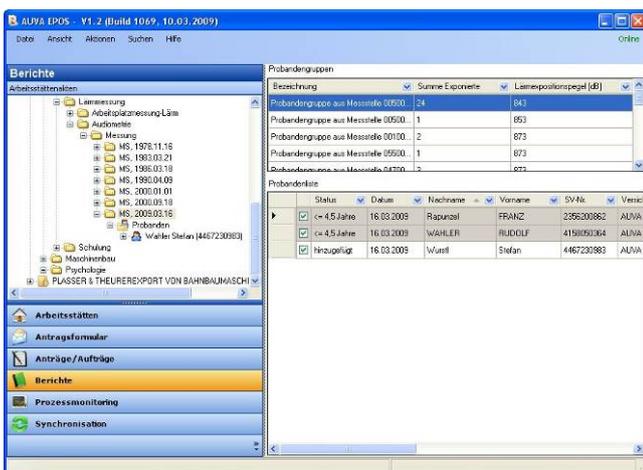
In the lower area of the screen is of a list of persons of the company, which have been investigated in a previous safety attendance. The next task means updating and possibly completing this list with the names of the new employees and assign to the right groups of evaluations. Over the social security numbers the employees are clearly identified and cannot be assigned doubly.

Figure 4: Audiometer

For the persons, who belong to a group with noise exposure, electronic forms are produced. With them on the one hand interrogations for certain statistic data, like a history of the individual activities, former diseases, kind of ear protection or ear pain and on the other hand an audiometric investigation itself is supported electronically. The positions of the controllers of the audiometer are displayed at the screen and stored by keystroke. Afterwards various reports can be generated e.g. for the employer and the compensation insurance.
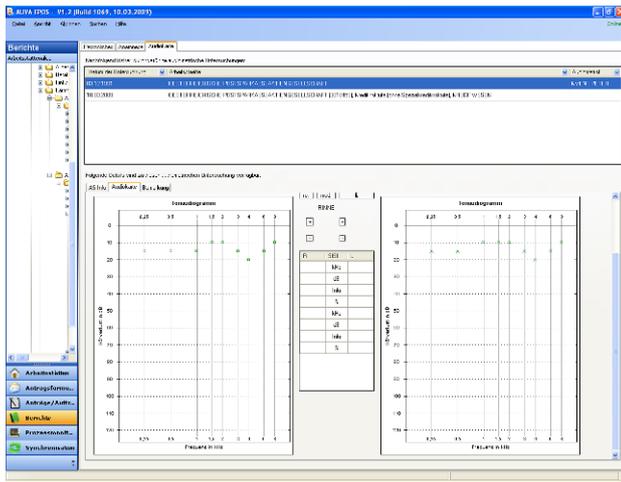
Figure 5: Audiometric Investigation

All expert groups such as chemistry, ergonomics, physics, electrical engineering, mechanical engineering and also noise prevention use one and same process, only the reports and documents are different. All data which generated by creating the noise and audiometric report are stored for future investigations and evaluations. The results of the investigations must also be kept by law for about 30 years to have them available in case of the entry of the occupational disease "noise induced hearing loss".

Conclusion

The challenges we have been faced with during the past six years of developing an enterprise-wide software system supporting the business processes of the customer, are described briefly in the following.

One of the major problems in this project has been misunderstandings of software prototypes and the final product version. Other than a car prototype, where almost everyone assumes that the basic functionality is already built in and beautification and comfort are still to implement, it is different in software development. Especially, the meaning of user interface prototypes has to be explained clearly.

The fact of geographically distributed offices of the customer has made it harder to establish the requirements engineer as single intermediate between customer and development team and to organize user tests etc..

A basic principle of agile software development is the availability of the costumer. The advantage is that both customer and development team work together and questions of the development team (primarily concerning customer's requirements) can instantaneously be answered by the customer. However, it is simply not possible for field workers to be continuously available for questions.

In this case the opinion of customer is divided. For the informatics department it is comfort situation to let do the whole work of requirement managing and testing by the specialist department, in most cases scientists to the different fields of prevention of occupational risks. That meant in this project, everything such as general layouts of masks,

response times, kind of database, etc. has been defined by the prevention department.

Nearly four man-years of highly qualified employees have been exhausted. In preparation to this sort of projects in future it is necessary to develop a basic technical standard for how software has to perform. This will be useful and highly sustainable.

The software will be tested by the prevention department in the next weeks, date of release is summer 2009.

References

[1] Pichler, Rumetshofer, Wahler: Agile Requirements Engineering for a Social   Insurance for Occupational Risks Organization: A Case Study IEEE Requirements Engineering Conference in Minneapolis September 06