

Optimization of Construction Practices: Implementation of Modern Work Modules to Increase Attractiveness for Employees

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Abstract—Construction companies lack junior staff for construction management, with students lacking the appeal of the profession in particular. The conflict between the traditional job profile and the current desires of junior staff for contemporary and flexible working models must be resolved. Increasing flexibility is essential for the future viability of small and medium-sized enterprises. The implementation of modern work modules can help here. This paper presents the validation results of the developed work modules in construction practice.

Keywords—Modern construction management, construction industry, work modules, shortage of junior staff, sustainable personnel management, working time model.

I. INTRODUCTION TO THE PROFESSIONAL FIELD OF CONSTRUCTION MANAGEMENT

THE construction industry has established itself as a stable labour market and as a tool for addressing social challenges. The existing shortage of skilled workers therefore poses an even greater problem due to demographic change. [1]. Despite the steadily increasing number of graduates in architecture and civil engineering, two out of three construction companies are unable to fill their vacancies in the field of construction management [as of 2021]. [2], [3]. Given this context, the current working conditions do not offer very attractive framework conditions for young, well-trained junior staff. Within society, the profession of construction management is associated with a lot of stress and little holiday, unregulated working hours and a poor work-life balance. In view of this fact, it is important to survey the current status quo of employees and junior staff and to develop actionable recommendations for companies that counteract the current trend and have already shown practical effectiveness.

II. RESULTS OF THE STUDY SURVEY AND EXPERT INTERVIEWS CONDUCTED

A nationwide survey of students conducted by the University of Wuppertal in 2021 revealed that the occupational field of construction management is perceived as unattractive by young professionals [4]. Personal further training opportunities are important to just under three quarters of the students, with later implementation also seen as available in the field of construction management. Flexibility in terms of working hours

is also perceived by three quarters of all graduates as important in their later career choice. In contrast, this flexibility is rated as low by just under half of the students. A high degree of digitalisation is prioritised by 75% of the students in their future professional life. In summary, the field of construction management appears unattractive to future graduates, highlighting a pressing need for companies to take action.

The experts interviewed rated the personal development opportunities for the profession of construction management as rather positive overall. These include promotion opportunities, further training and the promotion of young talent, which are seen as a central priority by students in particular. The general level of digitalisation in the construction industry is perceived as rather negative by the respondents. According to the experts surveyed, home office and parental leave solutions can make the time of employees in construction management more flexible. The workload emerges as the biggest problem. Approximately 80% of the surveyed construction management employees stated that they work significantly more than the working hours agreed upon in their employment contract. Basically, according to the experts, the profession is not attractive for junior staff and is difficult to reconcile with private life [5].

III. RECOMMENDATION FOR ACTION ON WORK MODULES FOR EMPLOYERS

One solution to make the field of construction management more attractive is to develop recommendations for action in the form of work modules that offer great incentives for employees and a reward for their efforts in the occupational field. Among others, the following modules were developed within the framework of the ongoing research project "Modern Construction Management" at the University of Wuppertal.

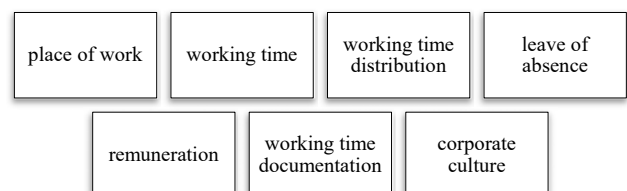


Fig. 1 Overview of the work modules

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The module Place of Work describes possible solutions to improve the flexibility of the employees' place of work within the construction management. Granting home office or mobile working promotes the compatibility of family and work and self-determined action is strengthened [6], [7]. Flexibilization of contractual working hours can be achieved through models such as job sharing, in addition to the classic full-time or part-time models. With this couple part-time work, two or more employees share a common workplace or a full-time position [8]. The personal distribution of working time makes it possible to make rigid working hours more flexible. Possible forms are flexitime, functional time, trust-based working time and annual working time [9]. A leave of absence or a sabbatical allow employees to take time off after a particularly demanding project, for example. A distinction can be made between the variants of unpaid and paid leave or parental leave. [10]. The Compensation module can include employee bonuses through monetary and non-monetary schemes. Monetary forms of remuneration include bonuses, allowances or commissions [11]. In addition, the health of employees can be promoted through subsidies. Examples are gym memberships, bicycle leasing or ergonomic workplace design [12]. Working time documentation describes the exact recording of the hours worked by each employee. These hours can then be accounted for using various approaches. Short-term accounts aim for a reference and compensation period of up to one year, while long-term accounts provide for a longer accrual period [13]. With regard to corporate culture, a basic distinction can be made between hierarchical or formal and open or informal corporate cultures. Hierarchical cultures mean fixed areas of responsibility and clear guidelines. Open cultures include trust,

appreciation, feedback, equality, teamwork and diversity management [14].

IV. STRUCTURE AND METHODOLOGY

In order to carry out a comprehensive validation, a wide range of companies of different sizes and sectors should be considered. The willingness to support and provide capacity was a decisive factor in the selection of companies as well as validations carried out. However, thanks to the extremely positive response in connection with the expert survey within the framework of the research project, suitable companies could be found for all work modules considered. A combination of expert interviews and online surveys was used to validate the work modules. During the validation periods, the online surveys were conducted and their content was aligned with the expert interviews. The surveys focused on communication between project participants, personal feelings and the impact on private life during the application of the work modules. Responses were measured on graduated response scales from very positive [five] to very negative [one] to capture personal attitudes to the different topics [15]. The results of the surveys then provided questions that were addressed in more detail in the expert interviews. Here, particular attention was paid to the circumstances prior to the application of the work modules as well as the different levels of communication and interfaces of the participants during the validation phase. Another focus was on the questioning of personal sensitivities before and during the application of the work modules, including the assessment of work-life balance and private life. The methodical procedure is summarised in Fig. 2.



Fig. 2 Concept of validate

V. VALIDATION RESULTS

The selection of the models was based on a combination of evidence-based and needs-based criteria. Work modules were chosen to provide significant potential for increasing workers' flexibility and feasibility. The aim was to investigate, as far as possible, the work modules that offered the greatest flexibility opportunities for employees and thus increased the attractiveness of the occupational field. The work models validated in companies include job sharing, which falls under the module of working time distribution, the validation of home office (place of work), sabbatical (leaves of absence), as well as working time documentation.

A. Validation Model: Job Sharing

Job sharing enables site managers to make their working hours more flexible by sharing their jobs, which improves the compatibility of private and professional life and increases the attractiveness of the company for different target groups. The validation of the job sharing work module lasted six weeks per

job sharer group and was conducted from October to December 2022. One company provided two site teams with two site managers each for the validation.

Interviews were conducted with four people working in the field of construction management and aged between mid-20s and mid-30s. The subjects carried out different implementation variations of job sharing. In the first group, each partner had alternated between using the entire Friday and the following Monday as days off, while in the second group, each subject had one fixed day off per week, giving them both a four-day week. In both groups, tasks on the construction site were divided into trades and a clear contact person was agreed upon to ensure that things ran smoothly despite absences. The subjects stated that the workload did not increase noticeably as a result of job sharing. Instead, an increase in efficiency due to the shortened working hours was recognised and the working weeks were planned more foresightedly.

In addition to the improved reconciliation of private and professional life, the opportunities offered by the work module

are seen above all in the increased attractiveness of the occupational field and the associated opportunities for employee acquisition and retention. Furthermore, job sharing allows employees more time for recreation and leisure, which in turn can be used as a preventive measure for occupational diseases such as burn-out. The relationship with the tandem partner turned out to be the greatest risk factor, as the mutual trust of the partners is a prerequisite for the success of job sharing. Furthermore, it became apparent during the validation that the application of the module depends on the subcontractor on the one hand and on the construction phase on the other. According to the test persons, there should not be a rigid division of labour, but it should be possible to adapt it to the needs of the respective construction site and the respective construction process. The module is intended to be flexible in its use and to allow workers to freely choose whether or not they can arrange the days off within the construction process. For example, the options listed provide for implementation up to a certain point within the construction process or a ban on implementation during the acceptance period of a project. The construction site team should be able to implement the application in a self-determined manner in order to achieve the greatest possible benefit for all parties.

B. Validation Work Module: Home Office

The home office working module was validated over a period of two months in November 2022. Three employees with different home office working patterns were involved: one person worked one to two days in the home office, another person worked basically in the home office and visited the site or branch only when needed, while a third person accumulated home office days over a period of two weeks and then spent a whole working week in the home office. Employees were surveyed every 14 days through online surveys and expert interviews were conducted at the end of the validation period. During the validation period, construction management tasks were divided into operational and administrative activities. Operational activities were carried out on site, while administrative activities were moved to the home office. It turned out that working in the home office is mainly suitable for diligence work, while construction meetings or agreeing on individual solutions to problems continue to take place on site. The internal communication of the construction site team improved subjectively, but the personal exchange with colleagues was missing. Disruptive factors such as an unsuitable climate or noise could not be identified by the participants in the home office; on the contrary, the absence of construction site noise was seen as positive. However, the lack of proximity to work colleagues and the need for self-discipline, which is not always given at home, were also considered critical. The experts agree that the home office in construction management makes sense and is viable for the future. Improvements such as better tax deductibility and more efficient data transfer were suggested.

C. Validation Work Module: Exemption

Time off is intended to give employees time to recover after a long period of work or during difficult phases in their lives

and to strengthen their performance and motivation. As part of the validation, two expert interviews were conducted with employees of a practice partner who have already taken or are seeking time off. In both cases, the employer specified the time for the release phase, which should take place at the end of a project, when all tasks have been completed and the handover to colleagues and superiors can take place smoothly. The duration of the leave period for both was between two and four months and was unpaid.

Both respondents said that the leave phase was a positive experience as they had time for themselves, family and friends, could travel and do things they do not have time for in their daily work. The financial burden was mentioned as a point of criticism, but they still recommend the leave phase to colleagues and friends.

Overall, the sabbatical was seen as a positive experience for work-life balance, especially for workers with families and children or for people who need time for themselves and their relationships. However, respondents recommend carefully considering the financial aspects.

D. Validation Working Module: Working Time Documentation

The expert interviews were conducted in January 2023. All participants had the same type of working time recording. This can be recorded digitally while working in the office, or it can be entered manually one day later. The latter method is used especially when working from home or away from home. Plus or minus hours can be recorded in a short-term account and flexibly reduced or made up as needed. In addition, it is possible to transfer hours from the short-term account to a long-term account of up to three years and thus take longer time off. The following states are taken into account in the recording: coming, going, special break and travel activities. Statutory breaks and rest periods are automatically recorded by the system. Exact descriptions of the activities do not have to be prepared by the employees; this is only necessary if several projects are being worked on and internal accounting takes place.

Employees do not perceive time tracking as a restriction, but rather as a relief. It leads to a more realistic workload and enables employees to meet private and family obligations. The work-life balance is perceived as good to very good and the workload is subjectively handled more efficiently. However, disruptive factors in the time recording software were identified and it was pointed out that targeted training of employees on self-organisation and time management could be helpful. The possibility of a more accurate post-calculation of the actual construction site overheads through a working time recording system was mentioned.

E. Conclusion of the Results

The field of activity of construction management is undergoing a change. The influence of digitalisation will increase prefabrication and standardisation within the construction industry. The increasing focus on sustainability ensures that the construction management task is becoming

even more complex, and specialisation in the various fields of a construction site is taking up more and more space. Previous research has confirmed that both the profession of construction management and studying civil engineering or architecture are not particularly attractive to young graduates [4]. This finding is based on the evaluation of a Germany-wide student survey as well as on the insufficient number of students in this field. The results clearly show that upcoming generations of professionals expect increased personal development, more flexibility in terms of time, a better work-life balance and greater digitalisation in the workplace. These needs are often difficult to reconcile with the working conditions on a construction site. The results of the expert interviews further show that change is urgently needed. In particular, the widespread stress factors and excessive working hours represent a considerable burden and reduce the attractiveness of the occupational field. The current work culture needs to change, as in many other sectors the change is already more advanced.

Within the framework of a validation, different working models such as "working time recording", "home office", "job sharing" and the "time off" module were analysed in the field of construction management. The results show that an accurate recording of working hours can enable improved control and calculation and can have a positive effect on the work-life balance. With suitable framework conditions, home office can increase efficiency and productivity. Job sharing leads to relief and improved work-life balance, but requires flexible adjustments to project-specific requirements. The possibility of time off makes an important contribution to a better work-life balance.

Potential for improvement was also identified: The "home office" work model could benefit from individual support and measures against external disruptive factors. For the successful implementation of job sharing and time off, increased flexibility from both employee and employer and individual adjustments to the respective projects and teams are required.

VI. CONCLUSION

The current working conditions in construction management are proving to be unattractive for future generations of junior staff. This is further underpinned by surveys of currently working site managers further support this, indicating a generally low attractiveness of the occupational field. The use of these working models enables employers to increase their attractiveness for skilled workers and to retain existing staff. Furthermore, these working models aim to give employees more flexibility for professional and private activities and to improve working conditions. The validation of the working modules "place of work", "working time documentation", "distribution of working time" and "time off" identified opportunities and risks in the implementation. Although the application of all working models is possible in principle, the feasibility of implementation ultimately depends on the overall framework of action of the company. Many working models can be introduced in a cost-neutral manner and, if implemented in a targeted manner, can also lead to efficiency gains. However, most working models are strongly influenced by the

current project situation and the corporate culture. A high degree of flexibility on both sides, on the part of the employer as well as the employees, and a balance between the requirements and obligations of the employees leads to a sustainable win-win situation and high synergy effects on both sides. In the course of the project, only a limited number of working models could be validated. While the basic applicability could be confirmed, the depth of expression depending on the specific framework conditions of the company could not be conclusively investigated. More data are needed to link external factors and company key figures with the implementation of the working models.

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