

# Glossary

CM ProWork

## Table of contents

Capability .....	2
Communication competence .....	2
Competence .....	3
Competence development .....	4
Competence management .....	4
Competence report.....	4
Co-operate competence Cooperation readiness .....	4
Core task .....	5
Demand for training .....	5
Knowledge .....	5
Knowledge level .....	5
Learning relevance .....	6
Management of tasks .....	7
Position .....	7
Position report .....	7
Position suitability / fitness .....	7
Process related competence .....	7
Productions order .....	8
Qualification .....	8
Requirement .....	8
Skill .....	8
Social competence .....	8
Task .....	9
Task Capability .....	9
Task Inventory .....	10
Task Knowledge .....	10
Task related competence .....	11
Task Responsibility.....	11
Task Responsibility (action related) .....	12
Willing .....	13
Learning readiness .....	13
Work system .....	13
Workers .....	13
Working process.....	14

## Capability

The capability (mastery of tasks) is the condition noticeable in the working practice of Task Capability. Important indicators of the capability are error frequency and freedom from error, the speed of the performance, the handling assurance when performance conditions change and the quality performance.

In CM ProWork-Tool, to what extent the Workers master the tasks is classified for each individual task in the Task inventory. This classification takes place in three stages:

- Stage 0: *The worker (mostly) does not master the task .*

- Stage 1: *The task is partly mastered*

i.e. only under simple performance conditions / not alone / in difficult situations he needs assistance

- Stage 2: *The task is fully mastered*

i.e. also under difficult performance conditions / mostly independently / with all associated target requirements being met

The classification of the capability requires that the workers and their task have been known to the assessor for some time and that the assessor can understand the working processes in the working system well. The classification can generally be practised as self-classification or third-party classification or as a combination of both.

## Communication competence

This Process related competence is defined as motivation and ability to communicate with colleagues, managers and other persons in respect of work and company-related matters. It is categorised using the following scale and is represented in the competence report.

- Stage 1: low

The worker normally reacts only to direct questions / the worker does not react to questions without direct prompting.

- Stage 2: rather low

The worker asks own questions in discussions, but mostly acts passively.

- Stage 3: rather high

The worker asks questions in discussions and also expresses his or her own opinion.. These opinions cannot always be expressed completely correctly / completely understandably, however.

- Stage 4: very high

The worker works for communicative contact with other persons. He or she tries to understand others' opinions and can also explain complicated matters in his or her own words.

## Competence

is a description for the requirements in a person for successful action. These requirements (as called dispositions) are often related to various handling domains

- in the professional-specialist area (technical competence)
- in the area of interdisciplinary methods and techniques (method competence)
- in the communicative and social area (social and communication competence)
- in respect of the development of himself or herself (self-competence)

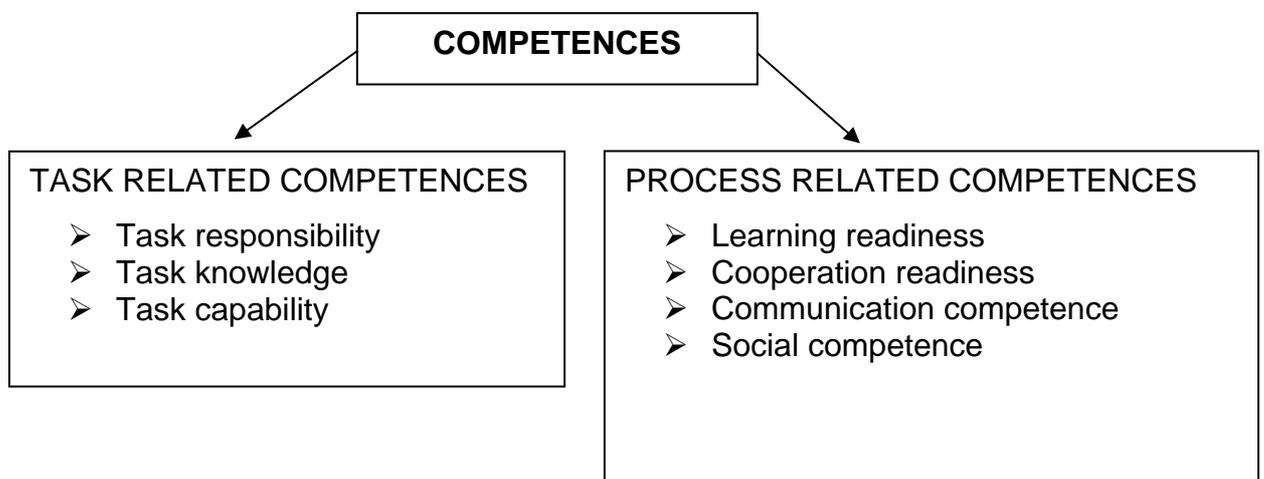
and are also due to the ability for personal self-organisation. It is indisputable that competence is not only based on abilities (knowledge and skill), but also on motivation (will) and convictions and values.

Because of the complexity and high dynamism of competence and the difference between the domains, in which it is expressed, it is not possible to measure competence uniformly. Instead, competence must be assessed from the verbal and active handling, performance and external conditions.

The development of the CM ProWork project aims to record and represent the competences which are acquired in production work - largely through task related learning. These competences relate to the handling domains of the tasks and work process.

- In terms of tasks, the tasks must be transferred responsibly (to make it one's own business), to master them and also to have the knowledge necessary for mastering them.
- In terms of working processes, the workers must consult communicatively and organisationally, cooperate with each other taking into account each others' interests, and be prepared to include the changes in technology and organisation through learning.

The tool takes these two handling domains into account in the working activity by distinguishing between task related competences and process related competences:



Task related competences are calculated by the tool, process related competences are categorised directly by the users. The results are scaled uniformly from 1 (lowest value) to 4 (highest value) without interim values, and are represented in the competence report.

### **Competence development**

is an active process which is largely designed by individuals without them having to be conscious of this. It is based on learning and experience in the working and living worlds. Competence development can be supported in the company environment through working conditions which promote learning, including through tasks with learning relevance and through resources needed for learning. Systems for competence management provide an instrumental basis for this.

### **Competence management**

is any company system which aims to track employees' competence development systematically and for success. Such systems typically include methods for determining competences, for deriving measures and measuring developments.

The CM ProWork-Tool can be used as the instrumental basis of a competence management system for production (M+E industry):

- It represents the task related competences and the process related competences of the workers in working systems.
- It is based on a concept of Management of tasks and thereby highlights the starting points for influencing the competence development: task structures and task and staff-related demand for training.
- It facilitates the establishment of competence-relevant positions, can represent their requirements and aids the allocation of suitable workers.
- Through repeated application, the development of competences can be recorded and represented.

### **Competence report**

The competence report can be accessed in the tool mode "Results". It represents the task related competences and process related competences for each worker with a score (1, 2, 3 or 4). These competence values are comparable between companies.

### **Co-operate competence Cooperation readiness**

This process related competence is defined as the ability (especially required in team and group work structures) for self-regulation of the cooperation in the task.

It is categorised using the following scale and is represented in the competence report.

- Stage 1: *low*

The worker only passes on directly required information / he only provides direct support.

- Stage 2: *rather low*

The worker passes on information and also supports without direct need / direct request.

- Stage 3: *rather high*

The worker participates jointly in the task (participates in discussions about procedures and keeps to them).

- Stage 4: *very high*

The worker organises, forms and assesses the cooperation and mutual support.

### **Core task**

The tasks contained in the standardised task inventory are considered in order in the assessment and are weighted, in particular, when calculating the task related competence.

The reason is the development goal of obtaining inter-company and transnationally comparable competence representations. However, the core tasks can be adjusted in terms of their name and characterisation to suit the working system being considered.

### **Demand for training**

This term is used in the CM ProWork-Tool to link tasks with learning relevance and selected workers. The demand for training is therefore person and task-specific: it shows which workers still do not sufficiently master what tasks (i.e. capability with values 0 or 1).

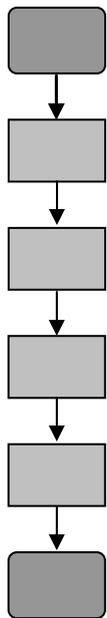
### **Knowledge**

describes understanding and experience which are represented in linguistic or symbolic (as characters, as a formula) form and which are communicated by several persons or in communities and which can be used actively. A specific part of the personal skill is recorded and represented in the tool in the form of task knowledge.

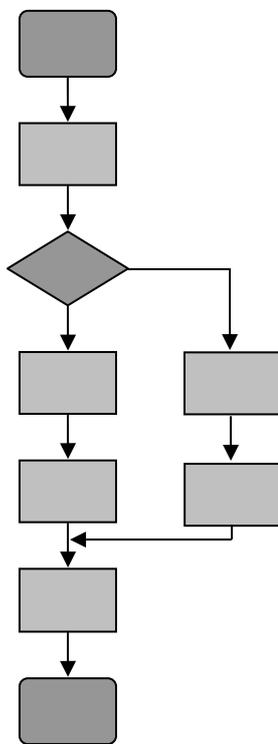
### **Knowledge level**

Each task of the task inventory is given a knowledge level value, which can be the stages 1, 2 or 3. These entries are the basis of the calculation of the task knowledge.

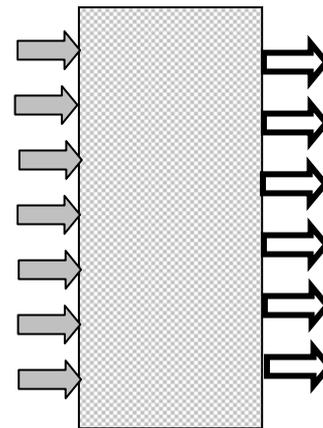
The knowledge requirements for the tasks are categorised using the knowledge levels. The stages are based on a psychological work model with which the complexity of task structures are represented and can be differentiated:



Task structure for knowledge level 1



Task structure for knowledge level 2



Task structure for knowledge level 3

- Level 1: tasks with linear (algorithmic) process orders:

The next working step takes necessarily place after each working step. The task-based skill is restricted to knowledge of the working steps and their order.

- Level 2: tasks with branched process orders:

The working process contains decision and judgement situations and, depending on these, different variations of the order. The task-related skill includes additional knowledge about different requirements, criteria, alternative actions, judgement samples and handling orders.

- Level 3: Warranty tasks (heuristic structure)

There is no defined process structure for the work activity, and instead this must be anticipated and tested, starting from the complex situation judgements. The task-related skill includes complex signal samples, differentiated access, condition and consequent skills. Warranty tasks are typically for monitoring, correction and improvement processes for automatic equipment.

### Learning relevance

The term is used in the tool to emphasise tasks which are not mastered in full by all persons to whom they are allocated. The tool represents the learning relevance with a figure between 0 and 1. The value 0 means that all persons responsible for the respective task have full capability. The value 1 means that all persons responsible for the respective task do not master the task.

## Management of tasks

is the process of planning, allocation, ensuring and assessing task in working processes. This process is typically assigned to in terms of responsibility to managers in production (master craftsmen, production managers, etc.) and has interfaces to organisational and technical development and to staff development (training, qualification, competence development).

## Position

In this tool, a position is a freely definable collection of tasks from the task inventory.

Positions are therefore task profiles which are independent of individual persons. They can be used as follows in the tool:

- They permit the allocation of tasks when entering the task responsibility.
- If the tasks have already been assigned requirements, positions can then be displayed as a list of tasks and requirements and can be used, e.g. for job descriptions.
- All defined positions are represented in the position report and it is displayed for each worker who has suitability / fitness for the positions.

## Position report

The position report can be accessed in the tool mode "Results". It lists the positions defined in set-up mode and is displayed for each worker who has position-relevant suitability / fitness. In this way, it can quickly be ensured, for example for staff shortages or for staff deployment planning, which workers are particularly suitable for occupying vacated positions.

## Position suitability / fitness

refers to the ability of workers to take over defined positions. Position suitability / fitness ranges in value from 1 to 10 and is calculated from the entries for task capability for the tasks allocated to the position.

## Process related competence

is one of the two competence dimensions in the CM ProWork concept as well as the process related competence. It refers to the workers' requirements for cooperation, communication and learning in the working process.

It is divided into

- Willingness to learn / learning readiness
- Communication competence
- Co-operate competence / cooperation readiness
- and Social competence.

## **Productions order**

Production orders are typically generated by upstream company processes and are included in working systems. They comprise at least the requirement of what products are to be produced when and in what quantity. After processing, production orders are reported as complete to superordinate or downstream processes. Production orders are therefore linguistically symbolic objects of planning processes and must not be confused with the actual products and production processes.

## **Qualification**

describes the acquired and demonstrated, mostly through examinations, performance requirements of professional activity in the teaching-learning processes (school, training, university, apprenticeship, etc). Qualification can play a more or less large role in forming competence (the connection has not been widely examined).

## **Requirement**

All actions required from tasks, situations and conditions are called requirements regardless of the person recorded. In the area of work activity, the requirements result, in particular, from the tasks and the implementation conditions. Requirements can be represented in various systems, e.g. as

- demanded service requirements (knowledge, skills, experience)
- demanded educational requirements (degrees, certificates, credentials)
- Level of physical and intellectual requirements (corresponding to the measuring system used).

Because of this difference, which can also be based in the various education systems, a standardised requirements statement is not used in the tool. However, it is possible for users to assign the task requirements in the task inventory in a freely selected system and can represent these together with the task structures of the positions.

## **Skill**

describes the competence dimensions of a person which are expressed in the successful handling of specific requirements. Part of the personal skill is recorded and represented in the CM ProWork-Tool in the form of task capability.

## **Social competence**

This process related competence is defined as the ability to detect different interests and requirements and to broker in conflicts. Social competence in a team ensured social cohesion.

It is categorised using the following scale and is represented in the competence report:

- Stage 1: *low*

It is difficult for the worker to recognise the needs of other persons in order, for example, to avoid unnecessary disputes.

- Stage 2: *rather low*

The worker accepts other needs and interests, but can barely avoid conflicts constructively.

- Stage 3: *rather high*

The worker accepts the needs and interests of other persons and tries to understand them.

- Stage 4: *very high*

The worker can negotiate solutions in conflict situations as a result of his or her social understanding in order to secure social cohesion in the working environment or to maintain this cohesion.

## **Task**

is a requirement for people to perform an activity which serves the operating objective. Tasks must be described using a key word at least (object of the task) and an activity word (object-based performance). The CM ProWork-Tool contains a Task inventory, which represents the tasks necessary for preparation, implementation, assurance and optimisation of production orders, ordered by working processes, subprocesses and tasks fields.

## **Task Capability**

is one of three dimensions of the Task Related Competence. It provides information about the ability which a worker has shown in dealing with real tasks. Task capability is even more pronounced as tasks are better mastered in practice (also under difficult performance conditions / without support). Task capability is based on various, mental performance requirements, including skills, handling routines, sensory performance, memory skills and handling strategies.

The tool calculates the numerical value of the task capability using the entries for Capability in the current conditions. The more tasks a worker masters, and the more he also fully masters, the higher is task capability. The requirement here is that the capability has been recorded irrespective of the current task responsibility. The range extends from 1 to 4, with no interim values:

- Stage 1: *low*

Only a few tasks in the task inventory are mastered / fully mastered

- Stage 2: *rather low*

Only some tasks in the task inventory are mastered / fully mastered

- Stage 3: *rather high*

Rather more tasks in the task inventory are mastered / fully mastered

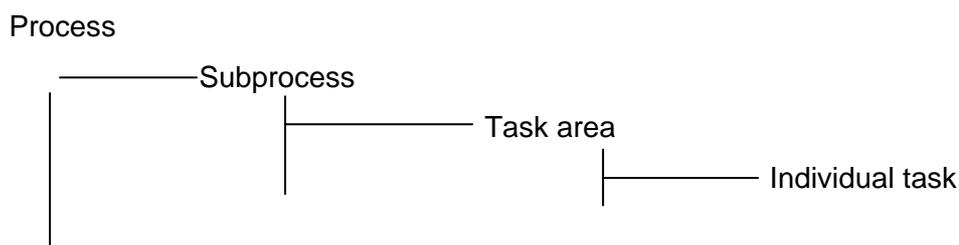
- Stage 4: *high*

Relatively many tasks in the task inventory are mastered / fully mastered

## Task Inventory

An ordered list of tasks, which are allocated to a working process or working system, is described as a task inventory. The CM ProWork-Tool is based on a standardised task inventory for general stock goods production. It was developed gradually in several projects and contains all tasks which are typically needed and are transferred to workers in order to process production orders in a modern, technically organised environment and to secure and continuously improve the associated processes. Management and modernisation tasks, which are typically performed by specially qualified managers and experts, are not contained in the task inventory.

The CM ProWork task inventory is relatively extensive and is organised hierarchically because of its integral character:



The task inventory is used at the individual task level. The standardised, prescribed individual tasks are called Core tasks and cannot be deleted, but if necessary are renamed and amended. It is also possible to blend out the core tasks if they are not to be used explicitly.

It is necessary to define the core tasks so that inter-company, valid and comparable values are calculated when calculating the task related competence.

## Task Knowledge

is one of 3 dimensions of Task Related Competence. It refers in part to the ability of the worker, to cope with tasks whose performance requires the realisation and use of knowledge about conditions, situations, technology and organisation of the production. This knowledge must be acquired in advance and must be applied repeatedly when performing the task. Only through acquiring and processing task knowledge is it possible to deal with more complicated tasks in more complicated situations.

Calculation of the task knowledge by the tool is based on the knowledge requirements connected with the tasks which the worker masters. The knowledge requirements are

represented in the tool as knowledge levels which have been assigned to each task in the task inventory. A distinction is drawn between 3 knowledge levels.

The tool takes into account whether the tasks fully mastered by the worker are connected with lower or higher knowledge requirements. The range extends from 1 to 4, with no interim values:

- Stage 1: low

The knowledge level for the mastered task does not go beyond the first level.

- Stage 2: rather low

Only a small proportion of the mastered task has a higher knowledge level.

- Stage 3: rather high

A larger proportion of the mastered task has a higher knowledge level.

- Stage 4: high

A relatively high proportion of the mastered task has a higher knowledge level.

### **Task related competence**

is one of the two competence dimensions as well as the process related competence. It refers to the requirements for responsible takeover and mastering of tasks and is divided into

- Task responsibility

- Task Capability Link ändern!

- and Task knowledge

The tasks contained in the standardised task inventory are considered in order in the assessment and are weighted, in particular, when calculating the task related competence.

The reason is the development goal of obtaining inter-company and transnationally comparable competence representations. However, the core tasks can be adjusted in terms of their name and characterisation to suit the working system being considered.

### **Task Responsibility**

is one of 3 dimensions of Task Related Competence. It informs about the responsibility transferred to a worker for a range of tasks which have been accepted by him or her personally. Task responsibility, therefore, is higher, as more tasks are transferred and depending on the difference between these tasks. Task responsibility is a competence which is closely connected with personal qualities such as performance motivation and the willingness to accept responsibility. On the other hand, task responsibility greatly depends on the fact that tasks from differing subprocesses are transferred to workers as a measure of competence development.

The tool calculates the value of the task responsibility using the entries for the current status of task responsibility. The entries for the three different processes in the task inventory are calculated separately and linked together.

The range extends from 1 to 4, with no interim values:

- *Stage 1: low*

In processes B and C, but also in A, there is limited task responsibility.

- *Stage 2: rather low*

In process A, also in one of the processes B or C, there is somewhat higher task responsibility.

- *Stage 3: rather high*

Task responsibility is higher in two of the three processes.

- *Stage 4: high*

Task responsibility is higher in the three processes.

### **Task Responsibility (action related)**

is the demonstrable transfer, takeover and implementation of tasks. It is the requirement of the competence dimension task responsibility perceived in practice. Full task responsibility includes the tasks being performed without constant requests and the responsibility for this being personally accepted.

In the tool, the respective task responsibility is categorised in a three-stage process for each individual task and each worker:

- *Stage 0: not responsible*

The worker is (mostly) not responsible in any case for performing the task

- *Stage 1: partly responsible*

The worker is not regularly responsible / only together with another fully responsible person for performing the task

*Stage 2: fully responsible*

The worker is regularly responsible / also without assistance / also alone for performing the task.

The classification of the task responsibility requires that the workers and their task have been known to the assessor for some time and that the assessor can understand the working processes in the working system well. The classification can generally be practised as self-classification or third-party classification or as a combination of both. It is also possible to class the task responsibility not only according to the current conditions, but also in a target condition (planned task responsibility).

## **Willing**

is the willed, motivational basis of acting and learning. In the tool, this motivational dimension of competence is recorded and represented both as task related (as task responsibility) and as process-related (as readiness willingness to learn).

### **Learning readiness**

This process related competence is understood as a willingness to learn new or amended tasks and to acquire the associated skill. It is categorised using the following scale and is represented in the competence report:

- Stage 1: *low*

The worker only accepts the learning of changes to tasks which he or she already masters.

- Stage 2: *rather low*

The worker accepts the learning of new tasks, but only in task areas (e.g. assembly), with which he or she is already familiar.

- Stage 3: *rather high*

The worker accepts the learning of new tasks in a new task area.

- Stage 4: *very high*

The worker accepts new, difficult tasks, including the acquisition of the necessary skill.

### **Work system**

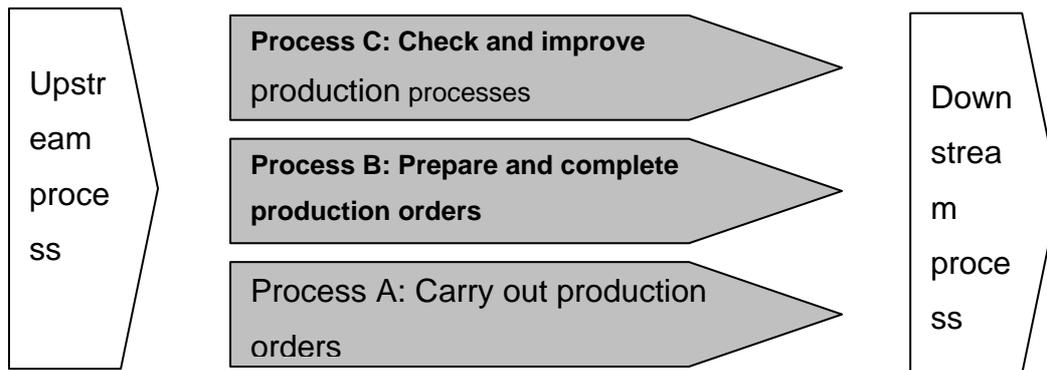
is an organisational unit in which the Production orders are processed and whose organisation members perform Tasks. In CM ProWork the typical working system comprises an organisational production unit, in whose working processes several workers are active, who are instructed by a manager (e.g. a master craftsman) or by several managers.

### **Workers**

are the target group of the Competence management with the CM ProWork-Tool. Workers are all employees in production who are not expressly employed as managers. Indirectly employed staff, such as assemblers and maintenance staff, can be considered, provided that they are active exclusively or mostly in the considered working system. The term worker is used in the tool as it is gender-neutral.

## Working process

The working process is the cooperative, task-based activity when manufacturing products. Industrial production is based on several working processes which run in parallel but which are independent of each other. Within the framework of the Task inventory a distinction is drawn between three main working processes:



Each main process is divided into two subprocesses:

- Process A: Subprocess 1: Production
- Subprocess 2: Maintain material flow
- Process B: Subprocess 3: Schedule production orders
- Subprocess 4: Prepare implementation of production orders
- Process C: Subprocess 5: Secure quality and productivity
- Subprocess 6: Improve quality and productivity