Sectoral Qualifications Framework for the Construction Industry in Europe

Project "Developing and Introducing a Sectoral Qualifications Framework for the European Construction Industry (SQF-Con)"

Final report of the Working Group

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Content

A Qualifications Framework for the Construction Industry in Europe

In this paper, a sectoral qualifications framework for the construction industry in Europe is presented. It was developed with contributions from the Working Group being part of the project "Developing and Introducing a Sectoral Qualifications Framework for the European Construction Industry (SQF-Con)", funded under the program LEONARDO DA VINCI.[1] Due to the tender, the development of the Sectoral Qualifications Framework was restricted to levels one to five of the entire European Qualifications Framework.

In the construction industry, a sector specific qualifications framework is of most use. European markets for construction services and labour are arising. Construction orders were submitted transnational. Employees were posted into other countries or they are seeking employment across the borders. A sector-specific qualifications framework will support cross-border activities in the construction industry by making qualifications more transparent and certificates more readable all over Europe, with no regard of the country nor the Vocational Education and Training system of their origin. It will support employees in construction to present their qualifications as well as construction companies to assess them. In doing so, it will assist companies' human resources management as well as employees' lifelong learning and continuous professional development. Thus, the Sectoral Qualifications Framework contributes to lifelong-learning policy of the European Union as well as to competitivity of the construction industry in Europe.

1. How to meet various varieties of working and learning in the construction industry in Europe

A sectoral qualifications framework for construction must be applicable in all European countries. Thus, it must be expressed in a general way, which covers various conditions of working and learning.

First variety: As well known from the field of vocational education and training in Europe in general, vocational education and training systems are school-based in some countries whereas they are company-based in others. Even more: in some countries (e.g. France, Italy) in the construction industry, school-based systems and company-based systems co-exist; the latter organised in co-operation by training-centres and companies. Moreover, due to the need of systematic practical training, in some countries training centres, besides classroom and site, play an important role as an additional learning venue. A sectoral qualifications framework must cover qualifications provided by all these different types of vocational education and training systems.

Second variety: construction industry is not homogeneous with respect to products and modes of working and producing. A sectoral qualifications framework must cover building and civil engineering as well as new building and renovation and as industrial and artisanal form of construction.

Third variety: construction industry contains a wide range of professions and occupations. Thus, a sectoral qualifications frame must not be specific to individual professional qualifications, but must cover all of them.

[1] Project number 137865-LLP-2007-DE-KA1EQF. For details see paragraph 4. below.

Thus, due to the overall aim of the Sectoral Qualifications Framework, a functional approach is needed, in order to construct a sectoral qualifications framework to be applicable as a common framework for the entire construction industry in Europe. This approach suggests following the logic, the principles and the structure of the European Qualifications Framework (EQF). The EQF, in order to serve as an overarching framework for all Europe, describes qualifications referring to learning outcomes. Learning outcomes are making a qualifications framework independent from all input variables like specific professional demands, individual learning routes or forms of learning as well as from vocational education and training systems of individual countries. As well known, to do so, EQF uses knowledge, skills and competence as descriptors to cover learning outcomes whatsoever their concrete nature may be.

Thus, this approach was adopted for the Sectoral Qualifications Framework for the European construction industry, because it meets the needs of a qualifications framework for the entire construction industry in Europe. The Sectoral Qualifications Framework follows the final version of EQF, proposed by the Commission and adapted by the Council and the Parliament. As EQF, the Sectoral Qualifications Framework is structured by levels and descriptors. However, whereas the EQF, in order to be valid also for all sectors of the economy, due to the needs of an overarching framework for all Europe is describing knowledge, skills and competence by levels in a general manner, the Sectoral Qualifications Framework intends to refer to learning outcomes specific for the construction industry.

2. Definition of EQF-levels for the construction industry

Levels of the Sectoral Qualifications Framework have to be expressed according to the demands of working positions in the construction industry. On site and inside enterprises there are different tasks and a division of labour. Their levels can be defined by

- range and complexity of operation someone has to execute,
- degree of detailing of instruction necessary to enable someone to fulfil a task,
- intensity and form of control: may it be that someone is subject of control or if he or she controls others.

Respective to the mentioned restriction of the project's frame, levels five to one are described here in more detail.

- **Level 5**

A most important work in the frame of construction projects is to link the phases of planning and execution. Employees in charge with this work do not have to be able to execute planning themselves, but they must understand principles and forms of planning and be able to transform the results of planning into detailed, short termed work plans and into a practical work organisation on site. They also have to be able to conduct and to supervise the work, to dispose labour, equipment and material in the frame of the overall planning, and to take responsibility for the fitting of results with tender specifications, quality norms and deadlines. Last but not least, the must be able to take over

responsibility for health and safety as well as for environmental issues. For this work knowledge, skills and competence on level five are required.

- **Level 4**

On bigger sites there are employees doing in principle the same work to link planning and execution phases of the construction project as described above, but who take over only parts of the full range or who are assisting an employee, who has the full responsibility resp. are working under his supervision. For this work knowledge, skills and competence on level four are required. Same requirements exist, when the full range of linking planning and execution is taken over, but on sites of small scale (not more than ten workers).

- **Level 3a**

Construction work very often is being done by small groups of workers, mostly called gangs. Gang leaders do the same work as gang members do, but moreover, their work requires very good knowledge, skills and competence concerning execution and additional ones concerning instruction and supervision of gang members as well as taking over responsibility for results. Referring to the fact that requirements on knowledge, skills and competence are not the same as on level four but to some respects more than level three, a new level 3a was inserted. Workers on level 3a are expected to have full knowledge, skills and competence as on level 3, and are in addition capable to conduct small groups.

- **Level 3**

Execution of work in the construction process on site includes all production work (like e.g. bricklaying, concreting, roofing, tiling, plastering or road making and others). Employees employed in this phase of production should be able to perform one or more tasks without any reservation. They must also be able to execute other tasks on site, if required, because knowledge, skills and competence are required in more than one field to safeguard flexibility of the company to take over various orders as well as to understand works upstream and downstream to manage interfaces properly. Furthermore, it is of most importance that employees are able to execute work without detailed instructions, autonomously and with supervision only on results rather than on procedure. For this work knowledge, skills and competence on level three are required.

- **Level 2**

If work in the fields of execution described above under level three is tailored more narrow and work is done inside a smaller range and under closer supervision, knowledge, skills and competence on level two are required.

- **Level 1**

For all work on site consisting of tasks of small range and low level, which can be done on the basis of only short instructions, which must be done under close supervision of procedure and where is no autonomy at all, knowledge, skills and competence on level one are required. However, this work included basic knowledge and competence concerning health and safety.

3. Sector-specific description of knowledge, skills and competence

Sector-specific descriptions of knowledge, skills and competence should reflect the demands of work in the construction industry. To define knowledge, skills and competence in a sector-specific manner, one has at first to take into consideration the procedure in which construction projects are processed. Projects in the construction industry, due to the one-off-production, are going on in characteristic phases. Once an order is received, work starts with the phase of planning. This phase is followed by phases of setting out site and surveying, before the phase of production itself is starting. The phase of handing over the product (building, bridge, road, renovated bathroom) to the client finalises the project.

Inside these phases, construction work is characterised by sector-specific requirements. They are mainly caused by the building of prototypes on variable sites, with a relatively low degree of standardisation, a high level of human intervention and in a cooperative process. To meet the needs of construction work on levels five to one, the characteristics of work on site have to be expressed. Knowledge, skills and competence, required on site, can be named as

- knowledge about equipment and material in use on site, as well as about the regulating and societal framework,
- all skills to execute operations on site and
- competence to be able to act and behave on site as well as in related working processes.

In different contexts, the one component or the other may have more weight. However, in all contexts all three: knowledge, skills and competence are needed.

Because requirements on knowledge, skills and competence differ by these phases, the Working Group first worked out separate matrices of knowledge, skills and competence by phase and level. These matrices are specific enough to cover the real working situation in construction. They are general enough to be applied in different countries and for various occupations.

Whereas in the phase of production knowledge, skills and competence of all levels are required, this is not the case in other phases. Thus, the respective boxes have been left blank. Concerning the phase of planning, it is to take into consideration that planning of the entire construction project is requiring knowledge, skills and competence on levels six and higher. These qualifications were, as mentioned before, not attended in the frame of the Sectoral Qualifications Framework. However, employees on level five have to have some knowledge, skills and competence in the field of planning, which are mentioned when describing level five below.

Other than EQF, which needs to be valid for all sectors and therefore consists of a general wording, for the Sectoral Qualifications Framework for the construction industry it is important to safeguard that all items, which are obligatory or necessary concerning knowledge, skills and competence in the construction process, are mentioned in the Sectoral Qualifications Framework.

Therefore, each of the three descriptors has been subdivided by sector-specific items. By this means completeness of description according to the needs of the sector is safeguarded (see table 1).

Table 1

Subdivision of EQF-descriptors according to characteristics of construction work

Knowledge („knows“)	**Skills („can“)**	**Competence („is able to“)**
tools, equipment	execute practical operations (practical skills)	manage control
material	execute logical operations (cognitive skills)	achieve results
rules, norms, regulation	planning, organising	take responsibility
procedures	communicate	
frame of action, actors, interfaces		

The nature of this subdivision follows from the characteristics of site production and the nature of work in the construction industry.

- **Knowledge**

Knowledge in construction must comprehend objects, procedures of execution and the framework of action. Objects are at the one hand equipment and tools and at the other hand material, which has to be handled. Procedures concern the execution of work (including the productive mode of execution). The framework is legal (e.g. laws, norms, regulation of working time or others), professional (e.g. rules of appropriate and professional work) and institutional (e.g. other actors involved and the interfaces to manage).

- **Skills**

Skills in construction consist of four elements, which can be described as different, even if in reality they are closely connected. Because construction work on sites is far less mechanised and standardised than working in other industries, working processes even on workers level are demanding not only practical skills, but also logical skills and skills to planning and organising one’s own work. Because of the co-operative nature of construction work, skills to communicate with others (colleagues, subordinates and superiors as well as persons from outside the site) on preconditions, procedures, execution and results is of high importance.

- **Competence**

Competence in EQF is described in terms of responsibility and autonomy. Again construction work by nature needs to split these requirements of ability in different parts. First is to manage and control one’s own work resp. the work of others in case somebody is superior to them. Second, according to the fact that working is not determined by machinery, it is employees who have to safeguard that results are achieved as prescribed by tender documents, work plans and timetables. Third follows from the fact that employees on site have to make decisions (e.g. if drawings are incomplete or not detailed

enough) and that quality of results is directly dependent from their handling. Thus, it is necessary that they take responsibility for results of their work as well as for health and safety and environmental issues on site.

4. A qualifications frame as means for the sector developed for by sector

The Sectoral Qualifications Framework has been developed in the frame of the project "Developing and Introducing a Sectoral Qualifications Framework for the European Construction Industry", funded under the program LEONARDO DA VINCI. Project management was taken over by Berufsförderungswerk der Bauindustrie Nordrhein-Westfalen e.V., (Düsseldorf, Germany). Project partners were BAQ Forschungsinstitut für Beschäftigung Arbeit Qualifikation (Bremen, Germany), Bildungswerk Bau Hessen-Thüringen e.V. (represented by its training centre in Erfurt, Germany), Bildungszentren des Baugewerbes e.V. (Krefeld, Germany), FORMEDIL, National organisation for vocational and professional training in the Italian construction industry (Rome, Italy), GOA Infra Foundation (Groningen, The Netherlands) and Casa de Meserii a Constructorilor (Bucharest, Romania). Further partner was Fédération Européenne de l'industrie de la construction (FIEC), the association of construction employers at European level, located in Brussels.

The Working Group consisted of members of each partner. Members of the Working Group were experts in vocational education and training in construction. Thus, the Sectoral Qualifications Framework is a means for the European construction industry developed by sector itself.

BAQ Forschungsinstitut directed the Working Group and provided the overall structure for the individual contributions. To do so, BAQ worked out the structure of the Sectoral Qualifications Framework by phases of the construction process and the subdivisions of descriptors according to the sector-specific requirements of the construction industry. As a result, BAQ provided schemes for each of the phases, structured by levels and by sub-structured descriptors. These schemes were used by members of the Working Group, which filled in knowledge, skills and competence for each of the phases as individual contributions (see paragraph 8.). BAQ also developed guidelines for drafting the descriptions of requirements, checked contributions of Working Group and gave comments and answered questions.

Working Group held three meetings to discuss drafts. After the third meeting, BAQ Forschungsinstitut worked out a summary of SQF-Con (see paragraph 7. below). An intermediate result of SQF-Con was presented to a first European conference organised in the Social Dialogue in European construction in order to get comments from a broader audience and preparing dissemination. The final result was presented to a second European conference again organised in the Social Dialogue in European construction in order to be adapted.

5. How to apply the Sectoral Qualifications Frame

The Sectoral Qualifications Framework provides descriptions of learning outcomes for construction by levels five to one according to the EQF-system. To make most use of it, the Sectoral Qualifications Framework first should be linked to national vocational education and training systems in construction. Such link requires involvement of and acceptance by institutions and organisations responsible for vocational education and training in the construction industry in the respective country. These may be, according to the national vocational education and training system, public authorities, social partners or chambers.

If the named authorities take initiative to implement the Sectoral Qualifications Framework, this would be foster its application top-down. To foster it bottom-up there are several possibilities.

Construction companies as well as training organisations can check certificates (existing ones or those to deliver in future), if they correspond with the descriptions of learning outcomes of the Sectoral Qualifications Framework. If so, they can develop rules of equivalence. This would increase transparency of qualifications and help disseminate the Sectoral Qualifications Framework. To improve conditions of doing so, diploma supplements containing descriptions of learning outcomes are helpful. (From 2012 on all certificates in the EU should be completed by diploma supplements anyway.)

Evidence of accordance to descriptions of learning outcomes could also be provided by documents referring to former learning. This should include former informal learning, i.e. learning at the workplace. Rules and procedures should be developed to link knowledge, skills and competence acquired at the workplace to descriptions of the Sectoral Qualifications Framework. The same could be done for witnesses of employers or self-witnesses. Last but not least, knowledge, skills and competence acquired by non-formal or informal learning could be assessed by tests. Training institutions and construction companies could develop such tests in co-operation. Descriptions of learning outcomes of the Sectoral Qualifications Framework could help to levelling such tests in order to link results to the national vocational education and training system and again improve transparency of qualifications and certificates.

6. Working process and contributions

The Sectoral Qualifications Framework was worked out by a working group of partners named above (see paragraph 4.) from Germany, Italy, The Netherlands and Romania. It started in early 2008 and was finished with a 2nd European conference in October 2009. Main actions, results and actors are given in the table below.

action	actors
Preliminary meetings of German project partners	
Presentation of EQF as general frame and developing of a working structure for drafting parts of a Sectoral Qualifications Frame for the European construction industry	BAQ
Agreement to overall working plan	German partners
Partner meetings	all partners
Agreement on working structure of drafting parts of Sectoral Qualifications Frame by phases of construction process	
Working out drafts by phases of construction process by partners	
Phase 1: Planning	BFW-NRW
Phase 2: Setting out site	BZB
Phase 3: Surveying	CMC
Phase 4a: Production Building	BIW-Bau
Phase 4b: Production civil engineering	Formedil
Phase 5: Checking, calculating and accepting	GOA Infra
Drafting by individual authors, comments and proposals for revision by BAQ, revision by individual authors, presentation at partner meetings, discussion and finalising at 3rd partner meeting April 2009	all partners
1st European conference (20 January 2009, Brussels)	
Presentation of intermediate result to members of Social Dialogue	all partners
Finalising	
Summarising of individual drafts to a coherent Sectoral Qualifications Frame	BAQ
2nd European conference (1 October 2009, Brussels)	
Presentation of final result to members of Social Dialogue	all partners

The Sectoral Qualifications Frame is subject to dissemination to be undertaken by all partners. Activities should include Bulgaria, France, Lithuania, Norway, Poland, Sweden and United Kingdom.

7. Sectoral Qualifications Frame for the Construction Industry in Europe

Level 5		© BAQ-Bremen
Knowledge („knows“)	**Skills („can“)**	**Competence („is able to“)**
Tools, equipment Knows in comprehensive manner technology of construction, in particular tools and equipment used on site for production: their functioning, modes of use and features of performance as well as the boundaries of capability and applicability; how to locate equipment for application on site; knows methods and tools for measurement and representation of land and construction details and of working drawings; knows in principle about statics in construction; knows budget software.	**Execute practical operations (practical skills)** Can at comprehensive range: work out the layout of a site; apply methods for measurement and marking; use data collected by measurement to calculate surface and volumes; quantify quantities; calculate requests for provisions and delivery of labour, equipment and material according to production needs and schedules as well as make respective dispositions; carry out inspections and control quality and conformity with contract; use ICT-equipment; supervise writing up accounts.	**Manage, control** Is able in comprehensive manner to manage sites including unpredictable situations; to instruct and conduct workforce; to dispose resources, to supervise works on site; to check situation on site against plan and control conformity with contract, quality norms, schedule and cost plan; to control health and safety and environmental protection; in case of divergences find remedy; to rearrange work activities on site, to manage variations, to solve problems and find alternative solutions.
Material Knows in comprehensive manner material used on site for production, its characteristics, modes of use and behaviour when processed as well as the boundaries of capability and applicability; how material is delivered and stored on site; how hazardous material has to be handled.	**Execute logical operations (cognitive skills)** Can at comprehensive range: understand planning, analyse and assess performance and feasibility; transform planning into applications engineering of labour, equipment and material on site; transpose on plan results of processed data and develop topographic plans; elaborate the schedule of surveying activities; recognise and prevent safety risks and evaluate the safety plan.	**Achieve results** Is able in comprehensive manner to ensure that aimed results will be achieved and resources are handled properly; to identify operations needed to carry out work; to estimate time required; to offer solutions for problems and to suggest improvements for the construction process; to supervise accounting for works carried out; to correlate the tolerance level of results of measurement.
Rules, norms, regulation Knows in comprehensive manner standards, rules, norms and legal duties on national as well as EU-levels relevant for production on site, applied topography, management of sites and production processes, quality management and vocational training, in particular concerning health and safety and environmental issues.	**Planning, organising** Can at comprehensive range: work out working plans; establish various work phases defining them in terms of resources, needs, realisation time and costs; handle specification systems; react to unforeseeable situations and solve technical and social problems on site; handle things ethically.	**Take responsibility** Is able in comprehensive manner to take responsibility for: procedures and result of work, quality and schedules, health and safety, environmental protection and vocational training of workforce; to intervene in case of divergence; to be aware of the client’s value for the company.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Procedures Knows in comprehensive manner methodology and procedures of planning, transformation of planning into production, control construction projects, quality control, surveying, marking and measurement, management of production on site (labour, equipment, material) including timetables, cost and return control systems; how to organise non-formal and support informal learning on site.	**Communicate** Can at comprehensive range: give to and receive from other actors involved in the entire construction project information necessary to run a site; communicate with actors outside site; document procedures and results of production process on site; report production data to superiors; inform about possible mismatches and/or propose corrections; formulate instalment plan and final payment; formulate how to save costs.	
Frame of action, actors, interfaces Knows in comprehensive manner responsibilities, roles, competence, rights, duties and way of work of other actors involved in construction projects.		
Level 4		© BAQ-Bremen
Tools, equipment Knows in a broad context tools and equipment used on site for production: their functioning, modes of use and features of performance; knows how to locate equipment for application on smaller sites; knows basic principles of methods and tools for measurement and representation of land and construction details; knows working drawings.	**Execute practical operations (practical skills)** Can at range of a smaller site: work out the layout of a site; apply methods for measurement and marking, collect and record accurate topographic data; use data collected by measurement to calculate surface and volumes; calculate requests for provisions and delivery of labour, equipment and material according to production needs and timetables; make respective dispositions; control quality and conformity with contract; use ICT-equipment.	**Manage, control** Is able to manage work processes on sites in the frame of guidelines, to instruct and conduct workforce and to dispose resources (equipment, material) as well as to supervise works on site; to check work processes against plan and control conformity with plan, quality norms and schedule; control situation of health and safety and environmental protection; in case of divergences find remedy.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Material Knows in broad context material used on site for production, its modes of use and behaviour when processed; how material is delivered and stored on site; how hazardous material has to be handled.	**Execute logical operations (cognitive skills)** Can at range of a smaller site: understand planning, assess performance and feasibility; transform planning into disposition of labour, equipment and material of a working process; can transpose on plan results of processed data; can recognise and prevent safety risks.	**Achieve results** Is able to safeguard that aimed results of a work process will be achieved; is able to identify operations needed to carry out work and estimate time required; is able to offer suitable solutions for problems and to suggest improvements for the work process.
Rules, norms, regulation Knows in broad context standards, rules, norms and legal duties relevant for working processes on site, quality management, for applied topography; for management of production processes on site, in particular concerning health and safety and environmental issues.	**Planning, organising** Can at range of a smaller site: work out short termed work plans; establish various work phases defining them in terms of resources, needs and realisation time.	**Take responsibility** Is able to take responsibility for procedures and result of work processes of groups, for quality and schedules, as well as for health and safety and environmental protection.
Procedures Knows in broad context procedures of planning, transformation of planning into production, control working processes, quality control, surveying, marking and measurement, management of production on smaller sites (labour, equipment, material) including timetables and cost.	**Communicate** Can at range of a smaller site: give to and receive from other actors involved in the work process information necessary to run a site, document procedures and results of production process on site; report production data to superiors.	
Frame of action, actors, interfaces Knows in broad context responsibilities, roles, competence, rights, duties and way of work of other actors involved in construction projects.		

Level 3a		© BAQ-Bremen
Knowledge („knows“)	**Skills („can“)**	**Competence („is able to“)**
Tools, equipment Knows in a specialised field of activity tools and equipment used on site for production: their functioning, modes of use and features of performance; principle mathematical formulas for calculation of surface and volumes; Principle notions of technical design; basic principles of methods and tools for measurement of construction components; working drawings.	**Execute practical operations (practical skills)** Can at range of an individual work process: perform practical operations like level 3; apply methods for measurement and marking; use data collected by measurement to calculate surface and volumes, calculate requests for provisions and delivery of labour, equipment and material according to production needs and timetables as well as make respective dispositions; control quality and conformity with work plan; use ICT-equipment.	**Manage, control** Is able to manage work of small groups on sites in the frame of guidelines, to instruct and conduct working groups and to dispose resources (equipment, material) as well as to supervise works of working groups; to check work against plan and control conformity with plan, and quality norms; control situation of health and safety and environmental protection; in case of divergences find remedy.
Material Knows in a specialised field of activity material used on site for production, its modes of use and behaviour when processed; knows how hazardous material has to be handled.	**Execute logical operations (cognitive skills)** Can at level of a specialised activity: read construction drawings, calculate quantities, identify operations to be performed and estimate the time needed for them, can control the quality of material; can identify hazards to safety and health at the workplace and take action for avoiding such hazards; can check the result of work.	**Achieve results** Is able to safeguard that prescribed results of a work process will be achieved; is able to identify operations needed to carry out work and estimate time required; is able to offer suitable solutions for problems and to suggest improvements for the work process.
Rules, norms, regulation Knows in a specialised field of activity standards, rules, norms and legal duties relevant for working processes on site and quality management, in particular concerning health and safety and environmental issues.	**Planning, organising** Can at level of a specialised activity: work out work plans for a small group; establish various work phases defining them in terms of resources, needs and realisation time; take into consideration the link between one’s own work and the work done in prior as well as in later stages of work.	**Take responsibility** Is able to take responsibility for procedures and result of work processes of small groups, for quality and schedules, as well as for health and safety and environmental protection.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Procedures Knows in a specialised field of activity function of component subject to own work in the frame of overall construction; procedures of transformation of plans into work processes, control working processes, quality control, measurement, management of working processes (labour, equipment, material) including timetables.	**Communicate** Can at range of a specialised activity: give to and receive from other actors involved in the work process information necessary to perform the work, document procedures and results of the work process on site; report production data to superiors.	
Frame of action, actors, interfaces Knows in a specialised field of activity responsibilities, roles, competence, rights, duties and way of work of other actors involved in working processes on site.		

Level 3

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Tools, equipment Knows in a specialised field of activity tools and equipment used on site for production: their functioning, modes of use and features of performance; modes of maintenance, transportation and preserving; principle mathematical formulas for calculation of surface and volumes; Principle notions of technical design; knows basic principles of methods and tools for measurement of construction components; knows working drawings.	**Execute practical operations (practical skills)** Can perform one or more of the following tasks in a specialised manner and without detailed instruction and has basic skills in the others, including measurement, calculation of surface and volumes; controlling of quality and conformity with work plan and use of ICT-equipment: earthworks, protecting and insulating construction elements, laying pipes, conduits and sewers, structural elements of bricks, reinforced concrete, prefabricated elements, gypsum plaster and wood, roof structures made of wood, applying plaster, jointless flooring, tiling, building traffic routes (roads, tracks, waterways); can conduct machinery (plant) on sites; can survey and level construction elements.	**Manage, control** Is able to manage own work on sites in the frame of guidelines, to dispose material needed to check work against plan and control conformity with plan and quality norms; to take at the work place the situation of health and safety and environmental protection into consideration, in case of divergences find remedy.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Material Knows in a specialised field of activity material used on site for production, its modes of use and behaviour when processed; knows how hazardous material has to be handled.	**Execute logical operations (cognitive skills)** Can at level of a specialised activity: read construction drawings, calculate quantities, identify operations to be performed and estimate the time needed for them, can control the quality of material, can identify hazards to safety and health at the workplace, and take action for avoiding such hazards; can check the result of work.	**Achieve results** Is able to safeguard that prescribed results of his work will be achieved; is able to identify operations needed to carry out work and estimate time required; to suggest improvements for the work process.
Rules, norms, regulation Knows in a specialised field of activity standards, rules, norms and legal duties relevant for production on site and quality management, in particular concerning health and safety and environmental issues.	**Planning, organising** Can at level of a specialised activity: work out work plans for his own work; define resources needed and realisation time; take into consideration the link between one’s own work and the work done in prior as well as in later stages of work.	**Take responsibility** Is able to take responsibility for procedures and result of his work, for quality and schedules, as well as for his own health and safety and that of others and of environmental protection.
Procedures Knows in a specialised field of activity function of component subject to own work in the frame of overall construction; procedures of transformation of plans into work processes, control working processes, quality control, measurement, management of working processes (labour, equipment, material) including timetables..	**Communicate** Can at range of a specialised activity: give to and receive from other actors involved in the work process information necessary to perform the work, in particular understand job orders, document procedures and results of his work; report production data to superiors.	
Frame of action, actors, interfaces Knows in a specialised field of activity responsibilities, roles, competence, rights, duties and way of work of other actors involved in working processes on site.		

Level 2		© BAQ-Bremen
Knowledge („knows“)	**Skills („can“)**	**Competence („is able to“)**
Tools, equipment Knows in a specialised field of activity tools and equipment used on site for production: their functioning, modes of use and features of performance.	**Execute practical operations (practical skills)** Can perform one of the following tasks in a specialised manner and without detailed instruction, including controlling of quality and conformity with work plan: earthworks, protecting and insulating construction elements, laying pipes, conduits and sewers, structural elements of bricks, reinforced concrete, prefabricated elements, gypsum plaster and wood, roof structures made of wood, applying plaster, jointless flooring, tiling, building traffic routes (roads, tracks, waterways); can conduct machinery (plant) on sites; can survey and level construction elements.	**Manage, control** Is able to manage own work on sites under general supervision with autonomy in detail; to control conformity with plan; to take at the work place the situation of health and safety and environmental protection into consideration.
Material Knows in a specialised field of activity material used on site for production, its modes of use and behaviour when processed; knows how hazardous material has to be handled.	**Execute logical operations (cognitive skills)** Can at level of a specialised activity according to instructions: identify operations to be performed; control the quality of material; can identify hazards to safety and health at the workplace, and take action for avoiding such hazards; can check the result of work.	**Achieve results** Is able to safeguard that prescribed results of his work will be achieved.
Rules, norms, regulation Knows in a specialised field of activity standards, rules, norms and legal duties relevant for production on site and quality management, in particular concerning health and safety and environmental issues.	**Planning, organising** Can at level of a specialised activity: reflect how to work on work orders given; estimate if resources and realisation time needed differ from work programmes.	**Take responsibility** Is able to take responsibility for conformity and quality result of his work, as well as for his own health and safety and that of others and of environmental protection.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Procedures Knows in a specialised field of activity procedures of working processes, control working processes, quality control.	**Communicate** Can at range of a specialised activity: give to and receive from other actors, involved in the work process, information necessary to perform the work, in particular understand job orders; document procedures and results of his work; communicate with superiors.	
Frame of action, actors, interfaces Knows in a specialised field of activity responsibilities, roles, competence, rights, duties and way of work of other actors involved in working processes on site.		
Level 1		© BAQ-Bremen
Tools, equipment Knows in a specialised field of activity modes of use of some tools and equipment used on site for production.	**Execute practical operations (practical skills)** Can assist the workers who have been assigned with construction operations.	**Manage control** Is able to manage own work on sites under supervision; to take at the work place the situation of health and safety and environmental protection into consideration.
Material Knows in a specialised field of activity material used on site for production; knows basic principles of how to handle hazardous material.	**Execute logical operations (cognitive skills)** Can understand orders and carry out work at the work place as instructed and in compliance with safety regulations; can take care of his own health and safety.	**Achieve results** Is able to safeguard that prescribed results of work will be achieved.

Knowledge („knows“)	Skills („can“)	Competence („is able to“)
Rules, norms, regulation Knows in a specialised field of activity standards and legal duties relevant for his work on site, in particular concerning health and safety and environmental issues.	**Planning, organising** Can organize own work.	**Take responsibility** Is able to take responsibility for conformity of his work with orders, as well as for his own health and safety and that of others and of environmental protection.
Procedures Knows in a specialised field of activity procedures of working processes.	**Communicate** Can understand job orders and communicate with colleagues and superiors on work as well as on health and safety.	
Frame of action, actors, interfaces Knows members of his working group and their roles and competence.		