



WORLD CONSTRUCTION CHAMPIONSHIP

Qualification criteria for applicants in the team nomination "Steel and Reinforced Concrete Structures Installation"

ONE TEAM INCLUDES

Seven (7) workers:

- Production engineer — 1 person;
- Steel and reinforced concrete structures installers — 2 people;
- Manual electric welder — 1 person;
- Construction manager — 1 person;
- Engineering systems pipeline installer — 2 people.

APPLICANTS

Currently employed specialists.

COUNTRIES

Russia,
India,
Kazakhstan,
Kyrgyzstan,
Pakistan,
Uzbekistan,
Tajikistan,
Belarus,
Armenia,
Azerbaijan,
Moldova,
Turkmenistan,
Turkey,
Egypt,
Bangladesh,
Hungary.

1. PRODUCTION ENGINEER

GENERAL DESCRIPTION

The Production Engineer is responsible for the following: developing a Production Process Map; checking compliance of the scope of construction/installation works and the scope of structures with the approved documents, working drawings, building rules, codes and standards, technical specifications, and health & safety compliance; keeping records of the work completed; participating in acceptance of completed stages and works; and preparing necessary technical documentation.

QUALIFICATION CRITERIA REQUIREMENTS

Development and maintenance of the construction company's planning, production, and as-built documentation.

REQUIREMENTS FOR EDUCATION AND AVAILABILITY OF SPECIAL PERMITS/DOCUMENTS

Higher vocational (technical) education and at least 3 years' experience of working in the construction industry in engineering and technical positions or secondary vocational (technical) education and at least 5 years' experience of working in the construction industry in engineering and technical positions.

Documents:

- copy of the diploma/or a document confirming the right to carry out the activity;
- proof of occupational health and safety training, which is in force in the participant's country (copy).

SKILLS REQUIREMENTS

Need to be able to:

- organise the development and maintenance of construction planning and as-built documentation;
- allocate tasks to employees in a logical manner, taking into account the content and scope of production tasks and the professional and qualification requirements for their performance;
- draw up technical specifications and plan measures to improve the efficiency of the construction process;
- draft terms of reference and analyse the progress of production plans, technical and production documentation;
- read and analyse design documentation, detailed design documentation, and other construction technology documents;
- prepare the construction company's as-built documentation indicating the results of the work and operational construction control measures;
- develop the construction planning documentation with the necessary calculations, text, and drawings;
- draw up terms of reference based on the construction management plan and develop work execution designs; and
- draw up flow charts for types of construction work.

KNOWLEDGE REQUIREMENTS

Need to know:

- fundamentals of construction work planning;
- composition and design requirements for production planning and as-built documentation in the field of construction;
- composition, development methods, and design requirements for production planning documentation in construction;
- composition, design methods, and requirements for construction and demolition management plans;
- basic principles of structural design and the composition of design documentation;
- composition, methods of maintaining, and requirements for the execution of as-built documentation, including general and special work logs, Concealed Works Inspection Certificates, Critical Structures Inspection Certificates, and Engineering and Technical Networks Inspection Certificates;
- procedure for maintaining general and special work logs and as-built documentation;
- requirements of technical standards and guidance documents in construction;
- means, methods, and techniques of managing employees and work teams;
- modern construction technologies, new types of construction materials, equipment, tools, construction machinery and plant; and
- acceptance procedure for completed construction work.

JOB RESPONSIBILITY REQUIREMENTS

- developing and maintaining production planning and as-built documentation;
- providing the construction site with the necessary production planning documentation;
- maintaining the as-built documents and accounting records in the construction company; accounting records in the construction company; and
- preparing documentation for the acceptance of the construction project as stipulated in the design and detailed design documentation.

2. STEEL AND REINFORCED CONCRETE STRUCTURES INSTALLER

GENERAL DESCRIPTION

The professional installer manufactures metal structures from a range of rolled steel to create reinforced concrete structures in accordance with the design and production documentation and assembles prefabricated structures.

QUALIFICATION CRITERIA REQUIREMENTS

The performance of a range of works when assembling metal, prefabricated concrete, and reinforced concrete structures for buildings and structures.

REQUIREMENTS FOR EDUCATION AND AVAILABILITY OF SPECIAL PERMITS/DOCUMENTS

Secondary vocational education in steel and reinforced concrete structure installation, to at least Grade 4. Or: vocational training, retraining and further training and career development programmes for steel and reinforced concrete structure installation, to at least Grade 4.

Documents:

- document confirming the qualification/or a document confirming the right to carry out this type of work.
- proof of health and safety training, which is in force in the participant's country (copy).

SKILLS REQUIREMENTS

Need to be able to:

- select the appropriate tools, equipment, and materials to carry out the range of preparatory work for the installation of metal, prefabricated concrete, and reinforced concrete structures of buildings and structures;
- determine the serviceability of manual and mechanised tools used in the assembly of metal, prefabricated concrete, and reinforced concrete structures of buildings and structures;
- use rigging devices and mechanisms for mounting reinforcement structures to perform a set of preparatory works for the installation of prefabricated concrete and reinforced concrete structures of buildings and structures;
- install and fix embedded parts in accordance with the design when carrying out preparatory work for the installation of prefabricated concrete and reinforced concrete structures of buildings and structures;
- comply with the applicable health and safety, fire safety, electrical and installation safety requirements; and
- follow occupational health and welfare regulations and use appropriate personal protective equipment when performing installation.

KNOWLEDGE REQUIREMENTS

Need to know:

- methods and techniques for the installation of reinforcing and shell meshes;
- methods and techniques for the assembly and installation of rigging and lifting equipment and fixtures when assembling prefabricated concrete and reinforced concrete structures;
- slinging methods used when assembling prefabricated concrete and reinforced concrete structures;
- the design of the rigging equipment to be used when assembling prefabricated concrete and reinforced concrete structures;
- how to use rigging devices and mechanisms for erecting reinforced structures;

- the design of mechanised tools and how to use them when assembling prefabricated concrete and reinforced concrete structures;
- methods of assembly and installation of prefabricated concrete and reinforced concrete structures from individual elements;
- techniques for connecting and fastening elements of prefabricated concrete and reinforced concrete structures;
- how to dismantle prefabricated concrete and reinforced concrete structures;
- how to read drawings of prefabricated concrete and reinforced concrete structures; and
- applicable health and safety, fire, electrical, and installation safety requirements while on site.

JOB RESPONSIBILITY REQUIREMENTS

- organising one's workplace in accordance with the assignment and safety requirements for the installation of metal structures given reasonable level of responsibility;
- installing steel structures (ladders, fence platforms, supports, brackets, scaffolding, and additional bracing);
- installing steel structures (beams, purlins, lattice girders, ties);
- installing steel structures of the supports;
- installing steel frames;
- fastening permanent bolted connections when carrying out the installation of metal structures; and
- straightening deformed metal structures during the assembly of metal structures.

3. MANUAL ELECTRIC WELDER

GENERAL DESCRIPTION

The welder performs quality control of assemblies to be welded and quality welding of steel structures and pipework using various types of welding in different spatial positions and in strict compliance with the applicable detailed design and manufacturing documentation.

QUALIFICATION CRITERIA REQUIREMENTS

Manual arc welding of complex assemblies, structures, and pipelines made of various steels. Manual arc welding of complex building and structures/systems operating under difficult conditions. Welding of complex modular structures, with welds in any spatial position. Fusion welding of various parts of machines, mechanisms, and structures. Fusion welding of complex parts and assemblies.

REQUIREMENTS FOR EDUCATION AND AVAILABILITY OF SPECIAL PERMITS/DOCUMENTS

A manual welder with at least Grade 4 qualification, certified in two types of welding: manual argon arc welding and manual arc welding with a coated electrode.

Or: An electric and gas welder with at least Grade 4 qualification, certified in two types of welding: manual argon arc welding and manual arc welding with a coated electrode.

Or: A welder of Grade 3-4 qualification, certified in two types of welding: manual arc welding with a coated consumable electrode and gas-shielded manual arc welding with a non-consumable electrode. Both types of welding to be performed with respect to complex and critical structures.

Documents:

- document confirming the qualification grade/or a document confirming the right to carry out this type of work.
- proof of health and safety training, which is in force in the participant's country (copy).

SKILLS REQUIREMENTS

Need to be able to:

- read drawings and flow charts;
- select the spatial position of the weld for welding structural elements (products, sub-assemblies, components);

- use assembly jigs to assemble structural elements (products, sub-assemblies, components) for welding;
- use manual and mechanised tools to prepare structural elements (products, sub-assemblies, components) for welding, deburring of welds, and removal of surface defects after welding;
- use measuring tools to check the assembled elements (products, sub-assemblies, components) for compliance with the geometric dimensions in accordance with the welding procedure documentation;
- use design and manufacturing documentation for preparatory and assembly operations prior to welding and for cleaning welds after welding;
- check that the welding equipment is working and in good order;
- set up the welding equipment for welding;
- set up the gas apparatus for quality shielding of welded joints;
- master the technique of manual argon arc welding of non-swiveling pipe joints, with welds in any spatial position;
- master the technique of manual arc welding with a coated electrode on non-swiveled pipe joints, with welds in any spatial position;
- check the geometry of the weld with a measuring tool against the requirements of the design and production documentation for welding;
- correct surface defects; and
- check the quality of the welding consumables.

KNOWLEDGE REQUIREMENTS

Need to know:

- the design of the applicable welding equipment;
- the design of the applicable gas appliances;
- the physical and chemical properties of the shielding gases;
- the specifics of argon arc welding of steels;
- argon arc welding technology;
- the technology of manual arc welding with a coated electrode;
- the basics of electrical engineering within the scope of the work to be performed;
- methods of inspection and testing of welds;
- types of defects in welds, their causes, methods of prevention and elimination;
- the principle of selecting a welding regime by instrumentation; and
- grades and types of welding (filler) wire and electrodes; rules of quality control and preparation for welding.

JOB RESPONSIBILITY REQUIREMENTS

- organising one's workplace in accordance with the assignment and health and safety requirements for this assignment;
- carrying out preparatory and assembly operations prior to welding and clean welds after welding;
- performing manual arc welding (surfacing, cutting) with a coated consumable electrode on complex and critical structures (equipment, products, sub-assemblies, pipelines, components) made of various steels and designed for work under pressure, static, dynamic, and vibration loads;
- performing manual arc welding (surfacing) with a non-consumable electrode under shielding gas on complex and critical structures (equipment, products, sub-assemblies, pipelines, components) made of various steels and designed for work under pressure, static, dynamic, and vibration loads; and
- using a measuring tool to check structures before and after welding to ensure that their geometric dimensions conform to the requirements of the technical documentation for welding.

4. CONSTRUCTION MANAGER

GENERAL DESCRIPTION

The construction manager does the following:

- organises installation work in accordance with the design and production documents;
- ensures compliance of the technological sequence of installation works with the required quality;
- instructs workers directly at the workplace on safe methods of work performance;

monitors compliance with health and safety rules and takes measures to eliminate any deficiencies identified;
keeps records of the work completed;
participates in acceptance of completed stages and works.

QUALIFICATION CRITERIA REQUIREMENTS

Manage the production activities of the site area. Ensure the production targets are met on time and the required amount of construction and installation work is done to time and quality, in compliance with technical and design documentation. Ensure that employees comply with production and labour discipline, as well as health and safety requirements.

JOB TITLE

Master, foreman/forewoman, head of the construction site.

REQUIREMENTS FOR EDUCATION AND AVAILABILITY OF SPECIAL PERMITS/DOCUMENTS

Higher vocational (technical) education and at least 3 years' experience of working in the construction industry in engineering and technical positions or secondary vocational (technical) education and at least 5 years' experience of working in the construction industry in engineering and technical positions.

Documents:

- copy of the diploma/or documents confirming the right to carry out the activity;
- proof of occupational health and safety training, which is in force in the participant's country (copy).

SKILLS REQUIREMENTS

Need to be able to:

- conduct industrial health and safety briefings;
- identify harmful and/or hazardous factors that might affect construction work, workers, and the environment;
- determine the list of necessary collective and/or personal protective equipment for workers;
- perform documentary, visual, and instrumental quality control of the supplied material and technical resources and performed construction and installation work;
- work with flow charts and determine the time for the work to be carried out;
- work with inspection charts indicating the tools and fixtures to be used to control operations;
- determine compliance of the technology and results of the construction and installation work with the design and production documentation and flow charts;
- work with technical documentation; and
- read and analyse construction technical documentation to the extent necessary for the type of construction work to be performed.

KNOWLEDGE REQUIREMENTS

Need to know:

- requirements of production documents describing how to plan and perform the relevant construction work;
- construction planning and technology;
- design documentation for the work to be performed;
- general industrial safety, occupational health and safety, fire safety, and environmental protection requirements;
- standards for the work to be performed;
- systems of planning, scheduling, and allocating the responsibility for construction assignments; and
- main harmful and/or hazardous work factors.

JOB RESPONSIBILITY REQUIREMENTS

- checking the completeness and quality of the design documentation, and assessing the compliance of the technical information contained therein with the requirements of the technical documentation;
- ensuring that the construction and thermal and mechanical equipment installation works are completed for the area for which this construction manager is responsible;
- bringing the construction site into compliance with health and safety, fire safety, and environmental regulations;
- accepting and checking the completeness of parts, components, and units of pipes, pipe fittings, and equipment;
- checking that the labels are in accordance with the working drawings;
- implementing operational planning and control over the execution of construction and thermal and mechanical equipment installation works;
- inspecting the condition of the external surfaces of the equipment, pipes, and pipe fittings;
- controlling adherence to the applicable construction and thermal and mechanical equipment installation works technology; inspecting the shape of cuts and the condition of the inner surface of the butt edges of pipe joints to be welded;
- inspecting welds by visual inspection, etc.; and
- maintaining the applicable as-built documentation for the construction and thermal and mechanical equipment installation works to be performed.

5. ENGINEERING SYSTEMS PIPELINE INSTALLER

GENERAL DESCRIPTION

A professional engineering systems pipeline installer must be able to perform individual mechanical, rigging, assembly, and inspection operations as well as the entire range of installation works related to pipework of engineering systems in compliance with the applicable detailed design and production documentation.

The pipeline installer prepares pipe elements (pipes, fittings, shaped fitting, flanges) for installation, lays out the route of pipelines, installs supports and retaining structures, fabricates parts of pipeline elements on site, assembles pipe elements into assembly units, and installs units and pipeline fittings.

QUALIFICATION CRITERIA REQUIREMENTS

Laying out pipe routes. Installing fittings, tees, and sectional bends. Connecting pipes with flanges. Installing pipes fittings.

REQUIREMENTS FOR EDUCATION AND AVAILABILITY OF SPECIAL PERMITS/DOCUMENTS

The qualification (Grade 4 or higher) of an installer of pipelines for engineering systems or/and an installer of technical equipment and related structures.

Documents:

- document confirming the qualification/or a document confirming the right to carry out this type of work.
- proof of health and safety training, which is in force in the participant's country (copy).

SKILLS REQUIREMENTS

Need to be able to:

- comply with the requirements of the pipework installation documents for industrial facilities;
- read working drawings and use other production/manufacturing documentation;
- use the accompanying documentation to check the completeness and quality of the installation;
- clean the pipelines of preservative grease, anti-corrosion coatings, and contaminants;
- control the quality of cleaning;
- use measuring tools;
- detect surface defects in pipes and welds;
- perform incoming inspection of butt edges for welding;
- carry out the slinging and moving of loads;

- repair minor defects in the pipes;
- store steel structures, pipes, and pipeline assemblies;
- use manual bench tools;
- use mechanised tools; and
- grind the surface of the welds to the roughness required by the design.

KNOWLEDGE REQUIREMENTS

Need to know:

- design, detailed design, and production documentation for the installation of pipes in the construction of industrial facilities;
- symbols on drawings and diagrams of the equipment to be installed;
- types and grades of pipes, types of piping components; and
- rules of sanitary and personal hygiene.

JOB RESPONSIBILITY REQUIREMENTS

- organising one's workplace in accordance with the assignment and health and safety requirements for this assignment;
- accepting, unpacking, and degreasing piping, fittings, and valves;
- preparing the piping for installation;
- installing piping;
- installing fittings, plugs, and support structures on pipelines; and
- dismantling pipeline elements, supports, and retaining structures.