

HS&E-Manual

Health, Safety & Environmental Protection Manual for external construction sites being site-managed by Rolls-Royce Power Systems AG and its Group companies

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1 General information

1.1 Purpose

This HS&E Manual is based on legal requirements, policy directives, principles and procedures and sets out the HS&E requirements and procedures for construction projects with a view to protecting the environment and ensuring the safety and wellbeing of everyone involved.

Rolls-Royce Power Systems AG (hereinafter referred to as “RRPS”) is represented by the site manager. The site manager is responsible for coordinating contractors/subcontractors and for checking the safety of work carried out.

1.2 Definitions and abbreviations

In this document the following words and terms shall have the meanings assigned to them below:

Term / Abbreviation	Definition
Work and services	Means all work and services which the contractor/subcontractor has to carry out as ordered, including all necessary auxiliary works.
Work permit	Is a permit to carry out relevant work, issued to the contractor/subcontractor by the customer in accordance with the work permit procedure in HS&E plan.
Customer	Is Rolls-Royce Power Systems AG or a registered or non-registered consortium in which Rolls-Royce Power Systems AG or one of the Group companies is involved.
Contractor/subcontractor	Is an enterprise which does not belong to the customer and which is involved in carrying out works and services under a contract or an order or subcontract with the customer and/or has been tasked with carrying our works and services.
Site manager	The site manager manages the construction site and is responsible for proper execution of works, coordinating the contractors/subcontractors and for checking that works have been carried out safely.
First aider	A first aider (first responder) is an individual providing first aid in cases of accidents. First aiders must be adequately trained (e.g. as per local regulations or, if none exist, to a recognized standard).
GHS “Globally Harmonized System”	The United Nations’ “Globally Harmonized System” (GHS) forms the basis for global harmonization of classification and labeling of dangerous substances.
HS&E	Health, Safety & Environment (health and safety at work environmental protection).
HS&E requirements	Comprises the entire requirements of HS&E or HS&E management as per applicable law, the customer's HS&E

	plan, the location requirements and the requirements of this document.
HS&E plan Customer	Represents a project plan for health, safety and the environment (HS&E) provided to the contractor by the customer with regard to execution of the works on site.
Client	Is the customer tasking Rolls-Royce Power Systems AG with implementation of a project and on whose property the project is being carried out.
Personnel of the contractor/subcontractor	Means the employees, representatives, visitors and all people connected to the contractor/subcontractor which the contractor/subcontractor deploys for the execution of works and services ordered (or part thereof) as well as all other individuals on site in this context.
Legal	Means the laws, provisions, decrees, regulations, standards or statutes of local and national government agencies with the force of law in the country in which the works and services are to be carried out.
Site	Means one or more locations provided or made available to the contractor/subcontractor by the customer to which plant, material, tools and equipment are to be delivered, where they are to be stored or where works and services are to be executed; as well as other locations in the vicinity which, where relevant, are actually used by the contractor/subcontractor in connection with the works and services, including access thereto.
Contract	Means the contract or subcontract between the customer and the contractor/subcontractor for the performance of works and services.

1.3 Applicability

This HS&E Manual applies to external construction sites of RRPS and its Group affiliates.

The HS&E requirements set out in this HS&E Manual apply to all contractors/subcontractors and their employees acting on behalf of RRPS on the client's premises during the planning, construction, installation and commissioning stages. The HS&E requirements are an integral part of the contract between RRPS and the contractor/subcontractor.

Other specific on-site requirements are to take precedence where they offer greater level of protection.

1.4 Project-specific HS&E policies and objectives for construction sites

By merging health protection, occupational safety and environmental issues, the project-specific HS&E policy for the planning, construction and commissioning stages aims to avoid hazards and define precise responsibilities and management control actions.

The primary objective on external construction sites is the prevention of occupational medical disorders, accidents and injuries as well as adverse environmental effects. To achieve this goal, the principle is:

- Zero accidents, this means no unsafe conduct, unsafe conditions or near misses.
- No damage or harm to property or the environment.
- No breach of HS&E directives.
- No health and environmental complaints.
- No damage to the reputation of the client, the customer and its contractors/subcontractors.

1.5 Breaches of HS&E requirements

Where a contractor/subcontractor is in breach of the HS&E requirements, the site manager may demand immediate cessation of works affected by this. Defects or hazards which have arisen must be remedied as soon as possible in order to ensure proper, compliant work processes once approval has been given.

For infringements of HS&E requirements the relevant contractor/subcontractor employees may be banned from the construction site. The site manager exercises RRPS' rights of authority on the premises including such rights assigned by the property owner.

2 HS&E management on construction sites

2.1 General HS&E requirements

The contractor/subcontractor shall perform all works and services in accordance with the given HS&E requirements, taking into account relevant statutory regulations and directives under applicable local law. The contractor/subcontractor shall attend the HS&E meetings organized by the site manager with a view to communicating all relevant HS&E issues.

2.2 Hazard assessment

The contractor/subcontractor must identify and document all hazards that may arise through works to be performed by its personnel. Supplementary working instructions may be necessary. Works to be carried out must be planned and organized in such a way as to minimize hazards as far as possible. The hazard assessments must be given to the site manager before work is commenced. Resulting health and safety actions must be explained, where necessary. Objections raised by the site manager must be addressed comprehensively without delay.

Essentially, hazards identified as part of preventive occupational safety must be avoided or minimized by the actions below:

- **Substitution:** Use of alternative materials (in the case of hazardous substances)
- **Technical:** Avoidance/eradication of hazards at source
- **Organizational:** Collective protection measures (technical and organizational)
- **Personal:** Individual protection measures (e.g. PPE, training and labeling)

2.3 HS&E plan (health & safety plan)

Prior to commencement of works on the construction site, the site manager will produce an HS&E plan and agree this with the client and the contractor/subcontractor. The HS&E plan is publicly available to, and binding upon, all contractors/subcontractors. The HS&E plan includes the applicable health and safety regulations and appropriate health and safety measures to mutual hazards. The site manager will check and, if necessary, amend the HS&E plan where changes arise during the planning, construction, installation or commissioning stages. The site manager will notify contractors/subcontractors of any changes.

2.4 Responsibilities at the construction site

The site manager is responsible for coordination and safe execution of works on the construction site. Management authority and responsibility for the safety, health and wellbeing of its employees at the construction site rests with the contractor/subcontractor.

2.5 Construction site personnel

The contractor/subcontractor will provide technically suitable, professional personnel for execution of works and services. These will be in possession of the required work permit, certificates and necessary instructions. Originals or certified copies of the originals will be provided to RRPS on request.

2.6 HS&E coordinator

The contractor/subcontractor will appoint an HS&E coordinator. The individual must have at least 3 years practical experience in HS&E. The HS&E coordinator will advise, monitor and coordinate all HS&E matters concerning the contractor/subcontractor. He/she will also act as a direct point of contact for the site manager.

2.7 Construction site organization chart

The contractor/subcontractor must establish a project-specific construction site organization and set this out on an organization chart which is then submitted to the site manager. This will contain names of those responsible for management and execution as well as coordination and supervision of occupational safety and environmental protection.

2.8 Reporting of accidents

The contractor/subcontractor will inform the site manager immediately of any environmental incidents, injuries, near misses and work accidents, unsafe conditions or practices.

A written accident report must be submitted to the site manager within 24 hours. This accident report will contain details of the underlying cause plus corrective health and safety measures to prevent future incidents. The contractor/subcontractor's obligation to report the matter to government agencies, etc. shall remain irrespective of this requirement.

2.9 HS&E report

The contractor/subcontractor will prepare a **monthly** HS&E report and submit this to the site manager. The following items are to be covered in this report:

- All HS&E events, including near misses and work accidents (whether or not resulting in downtime), damage to property, environmental incidents and any hazards presenting a major accident risk
- Training and instruction carried out
- Equipment checks and inspections
- Improvement suggestions, if any
- Minutes of on-site safety inspections

2.10 On-site safety inspections

Regular on-site safety inspections must be carried out by the contractor/subcontractor's HS&E coordinator and documented (minuted). Resulting actions must be implemented by the contractor/subcontractor. Checks to ensure all HS&E requirements and established procedures and actions are being met will also be carried out in the form of unannounced on-site safety inspections and audits by RRPS.

2.11 Government agency inspections

Government agency inspections may occur as per local rules and regulations without prior notification.

2.12 Radiation safety

In cases of activities associated with ionizing radiation or which are being conducted in the immediate vicinity, the contractor/subcontractor must contact the client's radiation safety officer and inform him/her of the planned radiation-safety-related activities.

Furthermore, the radiation safety officer must be presented with the documents required for the activity (approvals, qualification certificates, etc.) and agree the radiation safety measures and the timing and implementation of the relevant activities. Contact details may be provided by the site manager.

2.13 HS&E familiarization

Prior to commencing work activities, all co-workers must be instructed by the site manager and/or the HS&E coordinator concerning their rights and obligations during their deployment on the construction site and with regard to health and safety issues. Language barriers and communication problems must be taken into consideration and overcome. Potential hazards must be highlighted using the hazard assessment conducted. These familiarization proceedings must be documented in writing.

3 Construction site organization

3.1 Access to and presence on the construction site

Essentially, unauthorized persons are prohibited from entering the area of the construction site. The client's local arrangements in terms of site access, entry checks, the issuing of access IDs, etc. must be observed.

3.2 Housekeeping

Order and cleanliness are necessary prerequisites for safe working practices. Each contractor/subcontractor is responsible for the orderliness and cleanliness of work it carries out. Unusable left-over materials, etc. must be removed from the work area without delay.

Workspaces, passageways, stairs and all other areas must be kept clear. Materials must be stored in a proper, robust, safe manner. The load-bearing capacity of the flooring or substructure/ground must be taken into account.

3.3 Site visitors

Visitors are essentially not allowed onto the construction site. Exemptions must be obtained from the site manager. Before entering, visitors must receive instruction concerning the safety regulations. The person hosting the visitor (his/her point of contact) shall be responsible for ensuring that the visitor observes the safety regulations during his/her stay on site and that he/she is equipped with the appropriate personal protective equipment (PPE).

3.4 Site traffic

Driving on the construction site with vehicles is essentially prohibited. This does not apply to transportation of materials. Care must be taken of bottle-necks, superstructures and overhead power lines. Access roads must be kept free at all times for emergency vehicles. Parking is allowed in designated areas only. The relevant local rules must be observed.

3.5 Film and photographic equipment

The use of film and photographic equipment and of mobile telephones with built-in cameras is only permitted with the permission of the site manager.

3.6 Smoking, alcohol and intoxicating substances

Smoking is only permitted outside of buildings and within designated smoking areas on site. Working under the influence of alcohol, as well as the bringing of alcohol and/or drugs onto the construction site are not permitted and may lead to expulsion from the site.

3.7 Emergency arrangements and first aid

The contractor/subcontractor is obliged to maintain the availability of proper first aid material for its co-workers and to ensure a sufficient number of first aiders. An emergency plan complete with all emergency numbers (fire and accident) and the telephone numbers of the site manager, construction site address, etc. are posted at central locations.

The contractor/subcontractor shall ensure that all personnel are informed of the emergency plans and assembly points specified in the HS&E plan in order to ensure proper evacuation and roll-calls. Emergency planing activity will be managed by the site manager.

3.8 Occupational health screening

Occupational health screening examinations must be organized by the contractor/subcontractor in accordance with local laws. Each contractor/subcontractor shall be responsible for checking its co-workers' fitness for work and for carrying out the health screening examinations required as per the nature of work undertaken.

3.9 Traffic routes

Traffic routes must be kept clear at all times. They are, in places, also designated as escape routes and emergency vehicle routes, and are marked accordingly. To avoid tripping hazards, level traffic routes must be created where feasible. The client shall be responsible for snow clearing and illumination of common traffic routes unless otherwise stipulated.

4 HS&E requirements

4.1 Storage of materials and storage areas

All materials must be stored in a proper manner. Traffic routes and work areas must be kept clear. Flammable materials must be removed each working day. It is not permitted to use entrances, passageways and thoroughfares for storage purposes.

All receptacles containing oil or water-polluting substances and having a capacity of over 200 liters must be stored in a properly sized drip pan or be of jacketed construction.

In the workplace, no more than the daily requirement of hazardous materials may be stored in approved, labeled containers.

If it is necessary to store hazardous goods/compressed gas cylinders, the storage conditions must be agreed with the site manager. All compressed gas cylinders must be put away outside of buildings after work each day.

4.2 Personal protective equipment (PPE)

The contractor/subcontractor shall provide the necessary personal protective equipment for its employees and check proper use and maintenance thereof. For specific PPE, each party must obtain information itself in advance. Additional markings on site must be observed.

Basic PPE shall include as a minimum:

- Safety helmet (a.k.a. "hard hat")
- Safety shoes with steel toes (ankle-high with perforation-proof sole)
- Protective goggles
- Work gloves
- Ear protectors (a.k.a. ear defenders)
- High-visibility vest or protective jacket with reflective stripes

The necessity of wearing other personal protective equipment for certain work (for example, skin protection, respiratory protection) will be determined by consulting the relevant hazard assessment.

4.3 Handling hazardous materials

Before commencing work, the contractor/subcontractor shall give the site manager a list of all hazardous materials used ("Hazardous substance list") plus the required safety data sheets / instructions for use. The site manager shall be entitled to reject the use of certain hazardous materials. Co-workers must receive instruction on the safety data sheets / instructions for use in a language they can understand.

Use of carcinogenic substances is essentially prohibited. Danger to humans as a result of the hazardous substances being used or the hazardous substances arising during work must be avoided.

Hazardous materials used must be classified and labeled using the GHS system (Globally Harmonized System).



4.4 Work equipment

Work equipment comprises tools, machinery and equipment used for the work being performed. These must comply with current regulations, be in a safe operating condition and be tested regularly.

Defects and damage to work equipment must be rectified immediately. Continued use is strictly prohibited until defects have been rectified.

Checked work equipment must be properly marked. In addition, work equipment must be checked visually for obvious hazards and damage before work is commenced.

4.5 Fall prevention on construction sites

Appropriate measures for the safe execution of work at heights must be taken before commencing work. Where unfavorable weather conditions exist, e.g. thunderstorms, strong wind or the risk of frost or freezing, additional measures are required, or work must be ceased.

Openings in floors, ceilings and roof surfaces as well as cavities on sites must be equipped with protective devices for the entire duration of construction work.

Due to the risk of cracking, roofs without a load-bearing surface, e.g. glass roofs or corrugated sheet roofs, must only be crossed on running boards.

Barrier tape, rope and chain of any kind are not permitted as fall prevention measures and may not be used.

During work at heights or when there is a risk of falling, preventers must be rigged at the following drop heights:

- from heights of 0.00 m or more: over water or other substances in which it is possible to sink
- from heights of 1.00 m or more: exposed stairways and landings, wall openings, access to machinery, platforms, etc.
- from heights of 2.00 m or more: non-moving working positions and traffic routes

For working positions situated in higher or deeper locations, elevators, stairs, stair towers or similar must be used. Walkways with side guards must be set up where pits, ditches, etc. have to be bridged. In the case of stairs from 1.00 m height upwards, hand-rail constructions must be installed complete with side guards to three sides.

Where fall guards cannot be fitted for technical reasons, means must be provided by which to catch falling persons.

4.5.1 Ladders and steps

Ladders and steps used must comply with current applicable regulations, be in safe operating condition and have been tested. Damaged ladders and steps must be removed immediately from the construction site and withheld from further use.

A ladder may only be used to overcome differences in height with due consideration for safety regulations. In addition, only work on a small scale may be performed.

4.5.2 Scaffolding

All material for scaffolding must comply with local legal requirements. Work using scaffolding may only be carried out by suitably qualified individuals.

Scaffolding must be approved by the scaffolding contractor and have the approval certificate affixed to it in a permanently visible manner. Changes to scaffoldings must only be carried out by the scaffolding contractor.

Each scaffolding user is responsible for using it in accordance with its intended purpose. Prior to using the scaffolding he must check it for obvious defects.

Prohibitions:

- Unless completely closed scaffolding is used, work on the scaffolding must not be carried out while work is in progress below. In such instances the extent to which work may be continued must be agreed with the HS&E coordinator.
- Scaffolding may not be climbed onto via the side guards.
- It is absolutely prohibited to climb scaffolding using anything other than the ladders or on scaffolding framework, or using rods, latches and connectors. Failure to comply will result in expulsion from the construction site.

4.5.3 Rolling towers

Rolling towers must be constructed in accordance with the manufacturer's operating and assembly instructions and may only be assembled, taken down or rebuilt by suitable professionals.

Rolling towers may only be moved slowly and on even, load-bearing and obstacle-free surfaces. The procedure may only be undertaken when no persons are located in, on or around the tower.

4.5.4 Elevating work platforms

When working on elevating boom platforms, the operator and passengers must be secured by a suitable restraint system in the cage. Rolling towers may only be moved on load-bearing, obstacle-free surfaces. Unsupervised operation of elevating work platforms is only permitted for individuals over the age of 18 years who have been instructed in their proper use. All elevating work platforms must have been tested recently by a qualified person.

4.6 Working in containers and confined spaces

If work is carried out in containers and confined spaces, protective measures in line with the risk situation must be taken. Written permission (permission slip) must be obtained via the coordinator prior to commencing work.

The contractor/subcontractor must ensure that the individuals performing the work are instructed regarding the potential dangers and necessary precautions.

In general, the following measures must be ensured:

- Ensure ventilation.
- The atmosphere must be measured prior to entering and monitored constantly where necessary.
- As part of emergency management plans, a rescue plan must be kept to hand.
- The works must be continuously supervised by an additional outside individual.

4.7 Working alone

Working alone on hazardous jobs is strictly prohibited.

Where it is necessary to work alone, the site manager must be informed accordingly. Depending on the hazards involved, appropriate supervision measures must be taken. This supervision may consist of technical and organizational measures.

4.8 Electrical safety

4.8.1 Principles for working on live parts

Electrical systems and equipment may only be erected, altered and maintained by qualified electricians or electrically trained individuals under the direction and supervision of a qualified electrician.

When working on or near live parts or on electrical systems or equipment, the following risks (among others) may present themselves:

- electrical flow through the human body (electrocution),
- electrical arcing,
- secondary accidents and
- electrically caused fires.

Electrical operating rooms must be kept locked and be marked with warning signs. Admission is permitted only for qualified electricians and electrically trained individuals or trained employees under the supervision of a qualified electrician.

The following points must be noted when working on electrical equipment:

- Before starting work, the 5 safety rules must be observed:

1. Switch off
 2. Safeguard against switching back on, and mark the equipment in conjunction with the contact person
 3. Check there is no voltage present
 4. Cover or shield any adjacent live parts
 5. Earth (ground) and short circuit
- Work on live parts is not permitted; where work must be carried out on live parts in an emergency, one must consult with the site manager and take specific precautions noted in a work instruction. Troubleshooting on electrical systems may be carried out while power is on.
 - When using electrical equipment ≤ 32 A, an RCD circuit breaker must be used (30 mA). In the case of equipment > 32 A, an RCD circuit breaker (500 mA) is required. For frequency-controlled devices, a type B or type B+ RCD circuit breaker or an isolating transformer is required.
 - Electrical switchgear must be protected from the elements (weather).
 - Electrical equipment must be selected with due regard to the purpose to which it is going to be put.
 - Electrical systems and equipment must be checked for visible damage prior to each use. Damaged equipment must be discarded immediately.
 - Electrical equipment must carry a CE mark.
 - Electrical equipment must be protected against mechanical damage and moisture.

4.8.2 Power supplies using site distribution boxes

The power supply must be set up by qualified electricians. They must comply with local regulations.

It must be ensured that the cables and electrical equipment are free of defects and in proper order at all times.

4.8.3 Inspection intervals for electrical equipment

The proper condition of *portable* electrical equipment must be checked regularly by a competent individual. For guidance, inspection intervals should be 3 months. No inspection interval may exceed 12 months at the outside. Setting inspection intervals forms part of the contractor's/subcontractor's responsibilities.

For guidance, *non-portable* electrical systems and equipment should have an inspection interval of 12 months. The proper functioning of the site distribution box must be tested each working day by activating the test device (pressing the test button) and must then be documented in writing. Each month the effectiveness of the RCD circuit breaker must be tested by a qualified electrician or electrically trained person using suitable measuring and testing devices.

Evidence of testing is deemed correct where the equipment which has been tested and found free of defects is marked or labeled as such. The inspection records must be kept available at the construction and shown to the customer as required.

4.9 Fire safety and explosion prevention

Every fire must be reported immediately. Until the arrival of the fire brigade, firefighting operations must be commenced using extinguishing equipment available, albeit in so doing no one must expose themselves to any danger.

The contractor/subcontractor are responsible for checking whether adequate fire prevention measures have been taken in their respective work areas. Potential fire risks such as flammable packaging must be removed from the work area each working day.

The contractor/subcontractor is responsible for compliance with applicable fire safety regulations at the location. Fire extinguishers and welding blankets must be provided by the contractor/subcontractor. The fire extinguishers must be placed in visible and easily accessible locations. The operational readiness of the fire extinguishers must be checked regularly by a qualified person (at least every 2 years). Co-workers must be instructed regularly in use of fire extinguishers and other firefighting equipment.

Explosive areas and facilities may only be entered following approval by the site manager. All work (cleaning, fault rectification, maintenance, installation, etc.) may only be carried out following approval by the site manager. Specified precautions must be complied with long-term. Flammable materials and ignition sources must be avoided in these areas / facilities. After completion of work, all on-site monitoring devices must be reactivated.

4.9.1 Hot works

Where fire and/or spark producing work (e.g. welding, cutting or grinding work) is required, written consent (welding permit) must be obtained from the site manager before work is commenced. The local site manager may order that other measures such as fire-watch arrangements, etc. be taken.

Prior to the work being undertaken, all flammable items and materials must be removed by the contractor/subcontractor from the danger zone or protected using non-flammable materials such as welding blankets. Ceiling, wall and floor openings and pipes leading from the workplace into other spaces must be covered up. Provision of a safety watchman is generally the responsibility of the contractor/subcontractor.

4.10 Crane work

When installing construction site cranes, valid safety regulations must be observed.

Within the swinging arc of the crane, workers are at risk from falling objects. This danger zone is out of bounds to unauthorized individuals. Necessary work may only be carried out in consultation with the site manager.

Lifting gear and slings, etc. must comply with applicable standards and be checked periodically (incl. visual inspection prior to use). Slings, etc. must be marked with important information for operation such as safe working load (SWL), inclination angle and operating temperature. The use of slings and lifting equipment without SWL markings is prohibited.

Lifting equipment may not be used to transport persons. The taking of passengers on loads being lifted by cranes is also prohibited and will result in expulsion from the site.

4.11 Dust

Work equipment must be selected and operated in such a way as to minimize the amount of dust released. Dust-emitting work equipment must be equipped with an effective extraction system or the dust emission be prevented by other means. In the case of activities involving dust, dust-free workspaces should be saved from exposure.

Resulting dust residues must be removed using a moist or wet procedure. Cleaning of the work area by dry sweeping or blowing is prohibited.

4.12 Handling of synthetic mineral fibers and asbestos

Use of all types of asbestos and synthetic mineral fibers classified as carcinogenic is prohibited on the site. In the case of unexpected work on materials containing asbestos or synthetic mineral fibers, special precautions must be taken in consultation with the site manager.

4.13 Noise protection

The contractor must provide his employees with suitable ear protectors. There may be areas on the construction site in which increased ongoing or peak noise levels can be expected. When working with increased noise levels exceeding 85 dB(A) such as grinding, welding or cutting, ear protectors must be worn.

4.14 Commissioning and testing of systems

During commissioning or trial operation of systems, access to the equipment is prohibited for unauthorized persons. The presence of other persons must be restricted to an absolute minimum. Presence in this area without permission / safety instruction is prohibited. Further measures in the hazard assessment must also be observed.

Should unusual circumstances arise, such as noises, smells or fire, the area must be evacuated immediately, and the site manager informed. The equipment/system must be taken out of service immediately.

4.15 Weather-related health considerations

The contractor/subcontractor must take suitable precautions for its co-workers, taking due account of seasonal and weather-related conditions.

Health weather conditions. In all cases, employees on the construction site must be provided with suitable work clothing.

4.16 Principles of waste management

The contractor/subcontractor is responsible for ensuring that any waste is disposed of properly. Disposal and treatment of waste must comply with local laws, in consultation with the site manager, if required.

4.17 Soil and water pollution control

Substances hazardous to waters must be handled such that no risk of contamination is posed either to soil or to water (including ground water). Where unforeseeable events result in contamination of soil or water, the site manager must be informed immediately. Further measures should be determined locally.