

Company:.....

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Compiler:

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Date:

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StBG

Steinbruchs-Berufsgenossenschaft
(Association of German Quarriers)

Safety Checks

Risk analysis
as defined in section 5(1)
of the German Health and Safety at Work Act
(*Arbeitsschutzgesetz*)

Production of precast elements
for building and civil engineering

Safety checks

prescribed by the Association of German Quarriers

SC L	Guide to the production of checklists
SC 1	Extraction of natural rock
SC 2	Processing of natural rock (except calcareous slate)
SC 3	Extraction of natural rock (ballast, chips)
SC 4	Processing of natural rock (ballast, chips)
SC 5	Extraction and processing of gravel and sand
SC 6	Extraction and processing of calcareous slate
SC 7	Recycling plants
SC 8	Production of ready-mixed concrete
SC 9	Operation of concrete pumps
SC 10/11	Production of precast elements for building and civil engineering
SC 12	Production of concrete pipes, manhole rings and septic tanks
SC 13	Production of paving stones, edgings and kerbs
SC 14	Production of concrete slabs and terrazzo slabs
SC 15	Asphalt-mixing plants
SC 16	Office work

What is a safety check?

A safety check is nothing other than a thorough inspection of your works premises.

It can relate to particular areas of activity, workplaces or processes. Every method has its place. For example, in a small stationary workplace, such as an office, workplace-based checks will be preferred. An activity-based safety check may well be best in the case of works technicians or electricians.

In linked plants with both stationary and mobile workplaces the process-based check would be the most appropriate.

Why are safety checks needed?

As a company manager, you are responsible for the life and health of each of your employees at work. The specific measures you have to take in order to fulfil that responsibility depends on the analysis of the risks involved in the work your employees perform.

The legal basis of your duty to assess and document the risks involved in your company's operations is not only to be found in the Health and Safety at Work Act. The Accident Prevention Regulation - Quarries, Excavations and Trenches - also stipulates this requirement in its health and safety document.

Moreover, the protection of health and safety at work is an important economic factor. Staff absences resulting from accidents and occupational diseases mean that machinery stands idle and the smooth functioning of your company's operations is interrupted. Absences and idle machines cost you money.

Last but not least, serious accidents damage your company's reputation.

How to approach a safety check

In particular, you should lay aside any reticence about safety checks. Check your plant critically and identify the risks.

To keep your preparatory work and expense to a minimum, we have provided you below with a step-by-step example of a safety check in a standard plant in your industry. The example takes account of observed accident and occupational-disease patterns, statistics from the various areas of activity and scientific studies. In this way we were able to include the foreseeable risks and the corresponding preventive measures.

What you have noticed, the problems you have identified, should be recorded in the column of the safety-check form provided for that purpose (Further measures/observations/remarks)

Our suggestion:

- ⇒ Follow the **material-handling sequence** of your production process
- ⇒ Consider **all operational activities**, i.e. not only the production process. Equal relevance in terms of health and safety attaches to the maintenance, servicing and cleaning of your plant as well as to essential assembly and repair work.
- ⇒ You need not carry out the entire safety check at once. Depending on the amount of time at your disposal, you can deal with one or more production stages at a time.
- ⇒ When you carry out these safety checks, **speak to the staff** who work in the areas in question. They know exactly how the present conditions in their working environment have come about. If you are well informed, your staff will be better able to identify with the necessary measures.
- ⇒ **Check** that any measures you have prescribed are properly implemented.

How long does a safety check take?

That naturally depends on the care with which you conduct the checks.

Here, as in so many other walks of life, the secret is to put quality before quantity.

It took us a few hours to analyse a similar operational plant to yours. You will certainly need to spend that length of time on the task.

If you are personally unable to find that amount of time, you should make other arrangements, such as engaging the assistance of a safety specialist.

Our specimen safety check does not purport to be exhaustive. It is based on a standard plant and should be adapted to individual circumstances. Such checks can also go into greater detail.

Description of a standard plant

1. Introduction

The present catalogue of health and safety risks has been compiled for plants producing precast construction elements. Such plants manufacture large precast concrete elements for the building trade, such as wall sections, floor and ceiling slabs, binders, supports, garages and prestressed concrete parts.

2. General description of a standard plant

The extensive range of products, entailing a variety of production processes, means that there is scope for many different combinations of equipment and installations. In most plants the latest state-of-the-art technology is used for certain processes but coexists with older production facilities.

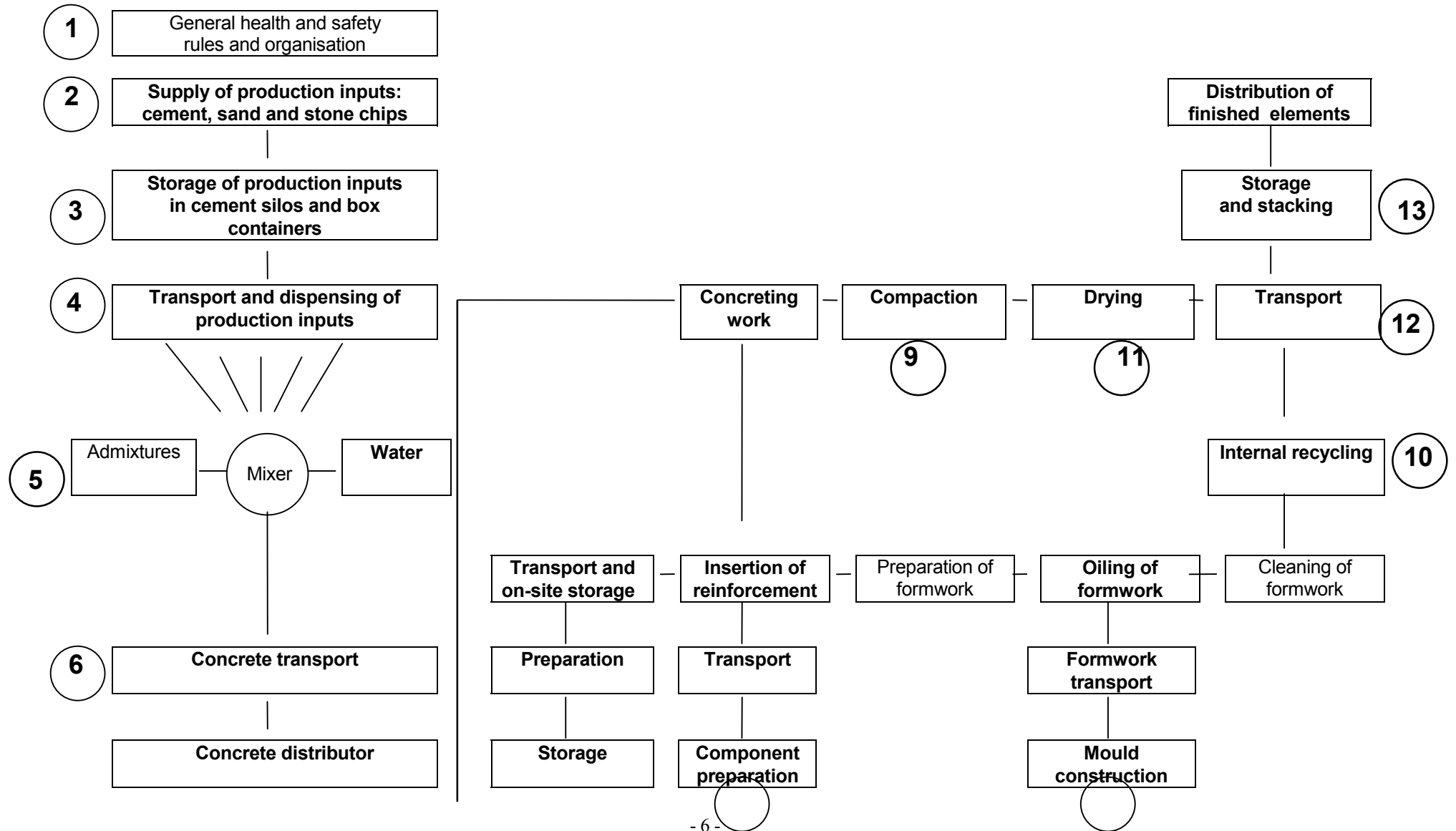
Besides the actual production areas with formwork trestles, formwork conveyors and tilting tables as well as battery forms and forms for special parts, precast garage units, struts, binders, structural floor slabs, etc., plants also include such facilities as concrete mixers with raw-material storage facilities, secondary production facilities manufacturing items such as formwork and reinforcement, mechanical and electrical workshops, storage areas for production aids and finished products, administrative offices and sales points.

The first stage in the production process is a mixer plant where the concrete is produced. The cement and aggregates are stored in silos and hoppers and on open-air stockpiles. They are transported to the mixers by means of continuous conveyors, draglines and inclined bucket conveyors. The cement is drawn directly from the cement silos into the mixers by means of screw conveyors. Water and aggregates are likewise fed straight into the mixer. The concrete mix itself is transported from the mixers to the treatment area with the aid of conveyances such as buckets attached to fork-lift trucks, crane-borne containers, monorail conveyors and concrete-distributor cars or even transit mixers. The concrete is brought in by distributor cars designed to run on rails, or is tipped directly from the conveyor buckets into the formwork. After treatment the concrete is compacted. To set the concrete, the formwork is heated or stored in a drying chamber. Afterwards, the finished elements are removed from their forms and are transported from the drying hall to an open-air storage facility by lifting machines, cranes and fork-lift trucks and are stacked there. The normal storage facilities for finished items are stacks, special storage structures such as comb-type containers, side stanchions and racks. The formwork is cleaned and sprayed with concrete stripper.

The construction of formwork involves the use of woodworking machinery such as circular saws, band saws, milling cutters and planing machines and metalworking machinery such as saws, welding equipment and right-angle grinders. The formwork is made of timber, plywood, plastics and steel.

In the bending shop reinforcements comprising round bars, steel mesh and girders are prepared with bending machines, rabbits, dynamo cars, straighteners, cross-cutting machines, hand-held right-angle grinders and mechanical shears.

Flow chart for safety checks on the production of precast building elements



Supply of reinforcement

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Safety Check

StBG

Company:
Address:

Association membership No:
Compiler:
Date:

1 General health and safety rules and organisation

No	General	Safety target/ reference sources	Measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
1.1	Legal provisions available on company premises	Health and Safety at Work Act (<i>Arbeitsschutzgesetz</i>) German Social Code, Book VII (<i>Sozialgesetzbuch VII</i>) Equipment Safety Act (<i>Gerätesicherheitsgesetz</i>) Labour Safety Act (<i>Arbeitssicherheitsgesetz</i>)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.2	Definition of employer's responsibilities	Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.3	Verification of compliance with safety regulations	Accident Prevention Regulations - Occupational Safety Specialists (VBG 122)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.4	Occupational health care	Accident Prevention Regulations - Company Physicians (VBG 123)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)

				(c)
1.5	Appointment of safety officers	Accident Prevention Regulations - General Provisions (VBG 1)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

1 General health and safety rules and organisation	Production of precast building elements	Page 2 of 29
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No	General	Safety target/ reference sources	Measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
1.6	Training of safety officers	German Social Code, Book VII (<i>Sozialgesetzbuch VII</i>)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.7	Works Safety Committee	Labour Safety Act (<i>Arbeitssicherheitsgesetz</i>)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.8	Appointment and training of first-aiders	Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - First Aid (VBG 109)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.9	Provision of first-aid equipment	Accident Prevention Regulations - First Aid (VBG 109)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.10	Provision of occupational health screening	Accident Prevention Regulations - Occupational Health Screening (VBG 100)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.11	Checking of technical work equipment	Accident Prevention Regulations - General Provisions (VBG 1)		(a) yes <input type="checkbox"/> no <input type="checkbox"/>

				(b)
				(c)

1 General health and safety rules and organisation
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Production of precast building elements
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No	General	Safety target/ reference sources	Measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
1.12	Regular briefing of staff	Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1) Publication ZH 1/644 (<i>Unterweisen</i>)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.13	Production of operating manuals	Accident Prevention Regulations - Construction Work (VBG 37) <i>et al.</i>		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.14	Provision and wearing of personal safety equipment	Accident Prevention Regulations - General Provisions (VBG 1)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.15	Register of hazardous substances	Hazardous Substances Order (<i>Gefahrstoffverordnung</i>) Publication ZH 1/632 (<i>Gefährliche Stoffe</i>)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.16	Safety signs at workplaces	Accident Prevention Regulations - Health and Safety Signposting of Workplaces (VBG 125)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
1.17	Fire safety	Accident Prevention Regulations - General Provisions		(a) yes <input type="checkbox"/> no <input type="checkbox"/>

		(VBG 1)		(b)
				(c)

2 Delivery of materials and aggregates
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Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
2	Delivery of materials and aggregates					
2.1	Vehicular access	Vehicle movements	Segregation of vehicles and pedestrians Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1)	<ul style="list-style-type: none"> - ensure that roadways are sufficiently wide and adequately hardened - adopt a one-way traffic system wherever possible - ensure that roadways and footpaths are clearly demarcated 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
		Noise and dust	Observance of permissible limits Accident Prevention Regulations - Noise (VBG 121) Accident Prevention Regulations - Hazardous Mineral Dusts (VBG 119)	<ul style="list-style-type: none"> - ensure that roadways are regularly swept to remove dust - ensure that roadways are regularly sprayed to bind dust 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
	Lorries and fork-lift trucks	Vehicle movements Collisions endangering drivers	Avoidance of personal injury and material damage Accident Prevention Regulations - General Provisions (VBG 1)	- regulate site traffic		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

3 Delivery of materials and aggregates
29
Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures	Results of check
					Observations / remarks	(a) defect (b) rectification deadline (c) rectified on (date)
2.2	Delivery and storage with the aid of cranes	Falling or swinging loads Crane movements Crushed limbs	Avoidance of personal injury and material damage Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Slings on Lifting Machines (VBG 9a), sections 31, 35, 37, 40, 41 Accident Prevention Regulations - Cranes (VBG 9), section 26 Accident Prevention Regulations - General Provisions (VBG 1), section 34(3)	- ensure that cranes are regularly inspected - ensure that faulty slings are taken out of service without delay - ensure that loads are not moved over people's heads - ensure that safety helmets are worn - ensure that a safety distance of at least half a metre is maintained - ensure that appropriate slings are used for loads such as coils		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
		Climbing onto stacks of reinforcement to fasten or undo slings	Avoidance of falls from a height Accident Prevention Regulations - General Provisions (VBG 1), section 33	- ensure that suitable climbing aids, such as ladders, are used - reduce stack heights		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
2.3	Unloading with fork-lift trucks	Falling loads Crushed limbs	Avoidance of injuries Accident Prevention Regulations - Fork-lift Trucks (VBG 36)			(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)

						(c)
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3 Storage of materials and aggregates
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Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
3	Storage of materials and aggregates					
3.1	Cement silos	Cement overflowing	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Silos and Hoppers (VBG 112), section 4	- fit crimp valves at feeder points and install level-sensors		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
		Connections coming undone or feeder hoses splitting	Avoidance of injuries Accident Prevention Regulations - Silos and Hoppers (VBG 112), section 4	- fit an interlocking fastener at the connecting point - ensure that faulty hoses are replaced without delay		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)
	Multichambered silos	Working inside silos	Avoidance of injuries Accident Prevention Regulations - Silos and Hoppers (VBG 112), sections 6, 14, 15	- install facilities for climbing and driving into silos and mechanisms for the removal of blockages		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

3 Storage of materials and aggregates
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Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
3.2	Feeder bins	Falling into a feeder bin	Avoidance of falls from a height Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1)	- ensure that the covering grid can support the weight of vehicles - ensure that lifting machinery is used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
3.3	Open-air storage containers	Bulk material moving during subsoil work Openings left uncovered when containers are empty	Avoidance of injuries Accident Prevention Regulations - General Provisions (VBG 1), section 37	- establish rules governing access to containers		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....
		Noise when material is gathered into piles	Avoidance of injurious noise Accident Prevention Regulations - Noise (VBG 121), sections 4, 6	- identify noise sources and adopt noise-reduction measures (possibly protective walls, etc.)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

4 Transport of materials and aggregates
29
Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
4	Transport of materials and aggregates					
4.1	Conveyor belts	Pinching points	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Continuous Conveyors (VBG 10), sections 5, 9, 10	<ul style="list-style-type: none"> - make pinching points safe by fitting guards or spacers - install a pull-cord emergency trip switch - install an emergency cutout switch - ensure that a startup warning signal is emitted where visibility is restricted 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
4.2	Bucket-chain conveyors	Crush points	Avoidance of injuries Accident Prevention Regulations - Continuous Conveyors (VBG 10), sections 7, 9	<ul style="list-style-type: none"> - ensure that openings are firmly closed and cannot be opened without the aid of tools 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....
4.3	Bucket elevators	Crush points on runners	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4(2)	<ul style="list-style-type: none"> - erect safety fencing around the bucket pit and on platforms - close off the access area by means of electrical limit switches for personal protection 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

4 Transport of materials and aggregates
29
Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Bucket falling from a height due to a snapped cable	Avoidance of personal injury and material damage Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), sections 4-5	<ul style="list-style-type: none"> - close off the access area by means of electrical limit switches - provide interlocking fasteners (socket pins) for repair or cleaning work within the fall zone - install a second limit switch at the upper end of the elevator - install an emergency cutout switch - ensure that the cable is inspected regularly and that faulty cables are exchanged without delay 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....
4.4	Feeder screws	Crush points caused by the opening of inspection flaps	Avoidance of injuries Accident Prevention Regulations - Continuous Conveyors (VBG 10), sections 7, 9	- install local controls (for individual screws)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....
		Electrical current	Avoidance of health hazards caused by electrical current Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 12(1)	- ensure that the electricity is switched off during repair and maintenance work		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c)

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of 29**
Production of precast building elements Page 10

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
5	Concrete production					
5.1	Mixer drum and housing	Rotary movement of machine parts	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	- install electrical interlocking mechanisms to ensure that access flaps and doors cannot be opened when the mixer is rotating - install local control switches to facilitate cleaning work - install a master switch		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Movement of the mixer flaps when opening and closing	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5)	- fit a catch to secure the opened mixer flaps - provide a hand winch to open the flaps		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....
		Falling from elevated workplaces during cleaning and repair work	Avoidance of falls from a height Accident Prevention Regulations - General Provisions (VBG 1), section 33	- provide safety fencing on platforms and landings		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Noise in excess of 85 dB(A)	Avoidance of injurious noise Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Noise (VBG 121)	- ensure that unnecessary noise (e.g. hammer blows) is avoided during cleaning work		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Dust	Avoidance of hazardous dusts Accident Prevention Regulations - Hazardous Mineral Dusts (VBG 119)	- restrict the release of dust during charging operations by means of air recirculation		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Oil spray	Avoidance of damage to health Hazardous Substances Order (<i>Gefahrstoffverordnung</i>)	- ensure that form oil is used sparingly to prevent contamination, possibly by prescribing brush application instead of spraying		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

5 Concrete production 6 Concrete transport Production of precast building elements Page 12 of 29

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
5.2	Delivery slide valves	Crush points and shearing points	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), sections 4(2), 12 Accident Prevention Regulations - General Provisions (VBG 1), section 33	- fit guards around the moving parts - ensure that residual energy from pneumatic operation is released - provide safety barriers to prevent falls from a height		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
6	Concrete transport					
6.1	Transport vehicles and fork-lift trucks	Vehicle movements in shed areas	Segregation of vehicles and pedestrians Accident Prevention Regulations - General Provisions (VBG 1), sections 25(1), 33(2)	- ensure that roadways and footpaths are clearly demarcated - ensure that vehicular access to pits is safe		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Emissions from diesel engines	Avoidance of health hazards Publication TRGS 514 - <i>Dieselmotoremissionen (DME)</i>	- ensure that the fork-lift trucks in use are fitted with catalytic converters - change the types of engine used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

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Production of precast building elements Page 13

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
6.2	Concrete supply buckets	Loads falling or swinging in transit	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Cranes (VBG 9), section 26 Accident Prevention Regulations - Slings on Lifting Machines (VBG 9a), sections 31, 33, 35, 37, 40, 41	<ul style="list-style-type: none"> - ensure that buckets are regularly inspected - ensure that faulty slings are removed without delay - ensure that loads are not moved over people's heads - ensure that safety helmets are worn 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
6.3	Monorail overhead bucket transport systems	Bucket travelling motion	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	<ul style="list-style-type: none"> - make working and transit areas safe - ensure that a safety distance of at least half a metre is maintained - equip the system with an emergency cutout handle - install a master switch - set aside a special position for maintenance and cleaning work 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
6.4	Concrete distributors	Travelling motion	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 24(3)	<ul style="list-style-type: none"> - avoid blind spots by installing additional aids such as mirrors 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

7 Reinforcement construction
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Production of precast building elements Page 14 of

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
7	Reinforcement construction					
7.1	Steel cross-cutting machines, sheeters and straighteners	Crushed limbs, puncture wounds and cuts	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	- fit guards - fence off the operational area in cases where supply carriages operate automatically		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
7.2	Rod reels	Crushed limbs Entanglement Whiplashing wires	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	- fence off the area - ensure that the unwinding mechanism is switched off as soon as the end of the wire is reached - ensure that welding equipment is used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
7.3	Manual separation and loading of supports	Carrying reinforcement elements	Avoidance of injuries	- ensure that lifting aids are used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....

7 Reinforcement construction
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Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
7.4	Cutting reinforcement elements with abrasive cutters (hand-held appliances and fixed installations), shears and saws	Rotary motion of cutting discs	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 24(3)	<ul style="list-style-type: none"> - ensure that nobody reaches into machinery when it is in motion - ensure that appliances are put down when not in use 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Flying sparks	Avoidance of eye injuries Accident Prevention Regulations - Metalwork (VBG 7n6), section 14	- ensure that eye protectors are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Flying fragments of shattered cutter disc	Avoidance of injuries Accident Prevention Regulations - Grinders, etc. (VBG 7t1), section 7 Accident Prevention Regulations - Metalwork (VBG 7n6), section 6	<ul style="list-style-type: none"> - ensure that safety hoods are worn - ensure that faulty or worn discs are exchanged without delay - ensure that all discs in use have been tested 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

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7 Reinforcement construction
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Production of precast building elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Noise	Avoidance of injurious noise Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Noise (VBG 121), section 10	- ensure that ear protectors are worn - use alternative cutters (guillotine shears)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Faulty power cables on hand-held appliances	Avoidance of health hazards caused by electrical current Accident Prevention Regulations - Electrical Installations and Equipment (VBG 4), sections 3, 5	- ensure that operating switches are insulated against humidity - ensure that appliances are regularly checked		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Climatic effects when cutting in open areas	Avoidance of damage to health Accident Prevention Regulations - General Provisions (VBG 1), section 45(3)	- erect a roof over the operational area - ensure that weatherproof protective clothing is worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....

7 Reinforcement construction
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Cutting with a hand-held appliance in a kneeling or crouching position	Avoidance of back strain Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1), section 18(1)	- ensure that trestles or tables are used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Sharp edges and corners of reinforcing steel	Avoidance of hand injuries Accident Prevention Regulations - General Provisions (VBG 1), section 4(2)	- ensure that protective gloves are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
7.5	Cross-cutting of reinforcing steel	Carrying reinforcing steel and expending physical effort on the cutting process	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4(2)	- ensure that, during the cutting process, steel is held in places where there is no risk of crushing - ensure that clamping devices are used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

7 Reinforcement construction 8 Formwork construction Production of precast building elements Page 18 of 29

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
7.6	Bending of reinforcing steel	Motion of the bending machine	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1), section 4(2)	<ul style="list-style-type: none"> - ensure that the operating elements and protective devices used are compatible with safety requirements - ensure that there is enough space between the bender bolts and the central bolt - ensure that long reinforcement rods are fed safely into the bender 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
7.7	Automatic welder	Electrical hazards, welding fumes, sparks and splashes	Avoidance of injuries Accident Prevention Regulations - Welding, Cutting and Related Processes (VBG 15), section 32	<ul style="list-style-type: none"> - ensure that electrical equipment is properly insulated - ensure that protective clothing is worn - provide for the extraction of welding fumes 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
8	Formwork construction					
8.1	Metalwork, welding and firing in workshops	Hot parts, sparks and splashes	Avoidance of injuries Accident Prevention Regulations - Welding, Cutting and Related Processes (VBG 15), section 28	<ul style="list-style-type: none"> - ensure that protective clothing is worn 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....

**8 Formwork construction
of 29**
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Welding fumes	Avoidance of health hazards Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Welding, Cutting and Related Processes (VBG 15), section 32	- provide for the extraction of welding fumes		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Ultraviolet radiation	Avoidance of injuries Accident Prevention Regulations - Welding, Cutting and Related Processes (VBG 15), section 5	- ensure that welding goggles and arc-welding helmets are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Formation of oxyhydrogen gas	Avoidance of injuries Accident Prevention Regulations - Welding, Cutting and Related Processes (VBG 15), section 9	- lay down specifications for areas in which welding takes place and/or fit flashback valves		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

8 Formwork construction
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Production of precast building elements Page 20

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
8.2	Woodwork with circular saws, band saws and other types of power saw, planers, etc.	Rotating blades	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Woodwork (VBG 7j), sections 38, 39	<ul style="list-style-type: none"> - ensure that safety hoods, splitting wedges and guiding rods are used - ensure that machinery meets all safety requirements 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Projected items	Avoidance of injuries Accident Prevention Regulations - Woodwork (VBG 7j), section 17(2)	- mark off the danger zone and prohibit unauthorised entry		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Sawdust and splinters	Avoidance of injuries Accident Prevention Regulations - Woodwork (VBG 7j), section 13	<ul style="list-style-type: none"> - install an extractor system - ensure that the woodworking area is regularly cleaned - prohibit smoking 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

8 Formwork construction**9 Preparation, concreting and compaction of formwork**
29**Production of precast building elements Page 21 of**

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Noise	Avoidance of injurious noise Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Noise (VBG 121), section 10	- ensure that maximum operating periods are observed - ensure that ear protectors are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
8.3	Formwork assembly	Forms toppling, swinging in slings or falling from a height	Avoidance of injuries Accident Prevention Regulations - General Provisions (VBG 1)	- provide supports - ensure that suitable lifting machines and slings are used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
9	Preparation, concreting and compaction of formwork					
9.1	Measuring forms	Elevated formwork conveyors	Avoidance of falls from a height Accident Prevention Regulations - General Provisions (VBG 1), section 18(1)	- ensure that suitable aids are used to reach pallets - provide catwalks where appropriate, e.g. next to binder or ceiling formwork		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

9 Preparation, concreting and compaction of formwork
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Production of precast building elements Page 22 of

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
9.2	Placing of spacers and reinforcement	Sharp edges Rough surfaces	Prevention of hand injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1), section 42	- ensure that protective gloves are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
9.3	Tensioners	Catapulting parts	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	- ensure that protective shields are used - fit a tensioner yoke		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
9.4	Concrete distributor	Vehicle motion	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 24(3)	- prevent blind spots by installing additional visibility aids such as mirrors - ensure that automatic cutout devices are installed		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

9 Preparation, concreting and compaction of formwork**10 Recycling, pick-and-place robots, construction of special forms**
29**Production of precast building elements****Page 23 of**

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
		Noise	Avoidance of injurious noise Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Noise (VBG 121)	- enclose the concreting area - provide for compaction by internal rather than external vibration - ensure that vibrators are equipped with frequency converters - fit rubber disengagers		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Vibration	Avoidance of damage to health Accident Prevention Regulations - General Provisions (VBG 1)	- ensure that nobody remains on a pallet during the vibration process		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
10	Recycling, pick-and-place robots, construction of special forms					
10.1	Pallets	Being struck by a vehicle or being crushed	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	- install an emergency cutout lever on roller supports - fit a starter switch without a self-locking mechanism - fit flashing on friction pulleys		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

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10 Recycling, pick-and-place robots, construction of special forms **Production of precast building elements** **Page 24 of 29**

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
10.2	Pick-and-place robots	Being struck by a vehicle or crushed	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	- fence off the operational area		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
10.3	Plotters	Being struck by a vehicle or crushed	Avoidance of injuries Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	- fence off the operational area - install a cutout mechanism		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
10.4	Cleaners	Falling into the refuse pit	Avoidance of falls from a height Accident Prevention Regulations - Powered Work Equipment (VBG 5), section 4	- erect safety fencing at the edges of the refuse pit		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

10 Recycling, pick-and-place robots, construction of special forms**11 Concrete drying****Production of precast building elements****Page 25 of****29**

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
10.5	Turning equipment	Being struck by falling precast elements	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	- fence off the operational area		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
10.6	Pits for soffit formwork such as garage structures	Falling into a pit	Avoidance of falls from a height Accident Prevention Regulations - General Provisions (VBG 1)	- erect safety fencing at the pit edges		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
11	Concrete curing					
11.1	Curing	Steam supply pipes	Avoidance of injuries Accident Prevention Regulations - General Provisions (VBG 1), section 45	- ensure that the formwork is fully covered - insulate steam pipes		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

11 Concrete curing 12 Removal of finished concrete elements Production of precast building elements Page 26 of 29

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
11.2	Rack feeders	Being crushed or falling from a height	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	- ensure that nobody can enter the drying chamber unless it is safe to do so - provide access facilities and the means of servicing the winch mechanism		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
11.3	LPG canisters	Explosion	Avoidance of personal injury and material damage Accident Prevention Regulations - Liquefied Petroleum Gas (VBG 21)	- avoid concentrations of gas - ensure that gas canisters are not stored in working areas		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
12	Removal of finished concrete elements					
12.1	Mechanical transport of finished ceiling units to the storage area	Swinging or falling loads	Avoidance of injuries Accident Prevention Regulations - Slings on Lifting Machines (VBG 9a), sections 31, 33, 35, 37, 40, 41 Accident Prevention Regulations	- ensure that lifting machines and slings are regularly checked and, if faulty, taken out of service without delay - ensure that loads are not moved over people's heads - ensure that safety helmets are worn		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

			- Cranes (VBG 9), section 26			
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12 Removal of finished elements
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources		Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
12.2	Tilting tables	Being crushed by falling elements	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - Powered Work Equipment (VBG 5), section 4	<ul style="list-style-type: none"> - ensure that the sling is attached to the upper end of the element - install a non-locking button and ensure that the tilting mechanism can be inspected 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
12.3	Cleaning pallets, conveyors and formwork	Falling from a height	Avoidance of falls from a height Accident Prevention Regulations - General Provisions (VBG 1), section 18(1)	<ul style="list-style-type: none"> - ensure that suitable aids are provided to enable cleaners to climb up and down safely 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
12.4	Spraying	Falling from a height or stumbling Oil spray Detonation of oil spray	Avoidance of injuries and damage to health Accident Prevention Regulations - General Provisions (VBG 1), sections 4(2), 18, 44 Hazardous Substances Order (<i>Gefahrstoffverordnung</i>) Accident Prevention Regulations (VBG 1), section 18(1)	<ul style="list-style-type: none"> - ensure that, wherever possible, spraying is carried out with special devices which do not require the user to climb onto the formwork conveyor - ensure that skin contact is avoided - ensure that gloves are worn - examine possible alternative substances 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

13 Storage and transport
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Production of precast building elements Page 28 of

No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
13	Storage and transport					
13.1	Site transport in sheds and storage areas using fork-lift truck	Vehicle motion	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1), section 26	- separate footpaths from roadways - regulate traffic movements on company premises (vehicles entering or leaving the site and site traffic)		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Stumbling hazards caused by storage in transit areas	Avoidance of injuries Accident Prevention Regulations - General Provisions (VBG 1), sections 18(1), 24(1)	- ensure that transit areas are kept clear - ensure that storage racks are used		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
13.2	Storage involving the use of a crane	Falling or swinging loads Crane motion	Avoidance of injuries Accident Prevention Regulations - Slings on Lifting Machines (VBG 9a), sections 31, 35, 37, 40, 41 Accident Prevention Regulations - Cranes	- ensure that lifting machines and slings are regularly inspected - ensure that faulty lifting machines and slings are taken out of service without delay - avoid situations in which loads have to be moved over people's heads - ensure that safety helmets are		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

		(VBG 9), section 26 Accident Prevention Regulations - General Provisions (VBG 1), section 34(3)	worn - ensure that a minimum safety distance in excess of half a metre is observed		
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13 Storage and transport
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No	Operation or area of activity	Risk, hazard or stress factor	Safety target/ reference sources	Possible measures	Further measures Observations / remarks	Results of check (a) defect (b) rectification deadline (c) rectified on (date)
13.3	Fastening finished elements to slings and unfastening them	Climbing onto stockpiles and falling Being crushed	Avoidance of injuries Accident Prevention Regulations (<i>Unfallverhütungsvorschrift</i>) - General Provisions (VBG 1), section 33	<ul style="list-style-type: none"> - ensure that suitable climbing aids are used - reduce stacking heights - ensure that a safe storage surface is provided - ensure that nobody stands between precast elements in stanchion or comb-type racks 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
13.4	Collection vehicles	Vehicle motion	Avoidance of injuries Accident Prevention Regulations - General Provisions (VBG 1), section 27	<ul style="list-style-type: none"> - segregate pedestrians and vehicles - regulate site traffic - ensure that roadways are regularly swept and sprayed - adopt a one-way traffic system 		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b) (c).....
		Loss of a load	Avoidance of personal injury and material damage	- ensure that loads are properly secured		(a) yes <input type="checkbox"/> no <input type="checkbox"/> (b)..... (c).....

