

Railcar unloading systems

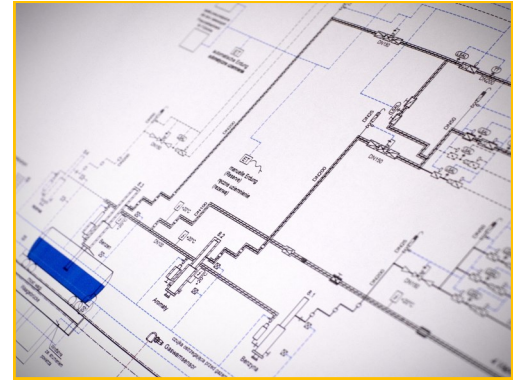


LOADING YOUR FUEL

Dipl.-Ing. SCHERZER GmbH

www.scherzer.net

Firmendarstellung:



Welcome to Dipl.-Ing. SCHERZER GmbH

The company's field of activities includes the planning and turn-key construction of plants for handling and storing liquid and gaseous products. Based on more than 50 years of experience in these sectors, the company offers a high degree of professionalism and is a leader in its field.

Our customers from the petroleum and chemical industries and from a range of other sectors at home and abroad value our groundbreaking technology and our high quality standards as well as our ability to address custom applications while optimizing the economic and environmental aspects of our designs.

Quality - Safety - Service

Social and environmental policy requirements place high demands on our company on a daily basis, as do constantly changing safety guidelines. These standards are our top priority. Consequently, all areas of the company are subject to a quality management system and certified in accordance with DIN EN ISO 9001:2015.

As a specialized company, we do, of course, have all legal permits necessary to operate both in Germany and abroad.

Our subsidiary, SCHERZER Umwelttechnik GmbH, will handle our after-sales service, allowing us to be there for you long after a successful start-up. Maintenance, the procurement of spare parts, and other important services will guarantee the continuous operation of your plant.

Range of services

Our comprehensive range of services includes:

- Concept design including essential performance characteristics
- Basic engineering
- Detail engineering
- Delivery of equipment
- Assembly of unit (for turnkey contracts)
- Supervision (for assembly by customer)
- Training
- Commissioning
- Performance check
- Documentation and handover
- Services

Scope of supplies and services

Our portfolio covers a wide range, allowing us to meet almost every requirement. In addition to new construction, it also comprises the retrofit, conversion or expansion of existing plants for the loading and unloading of:

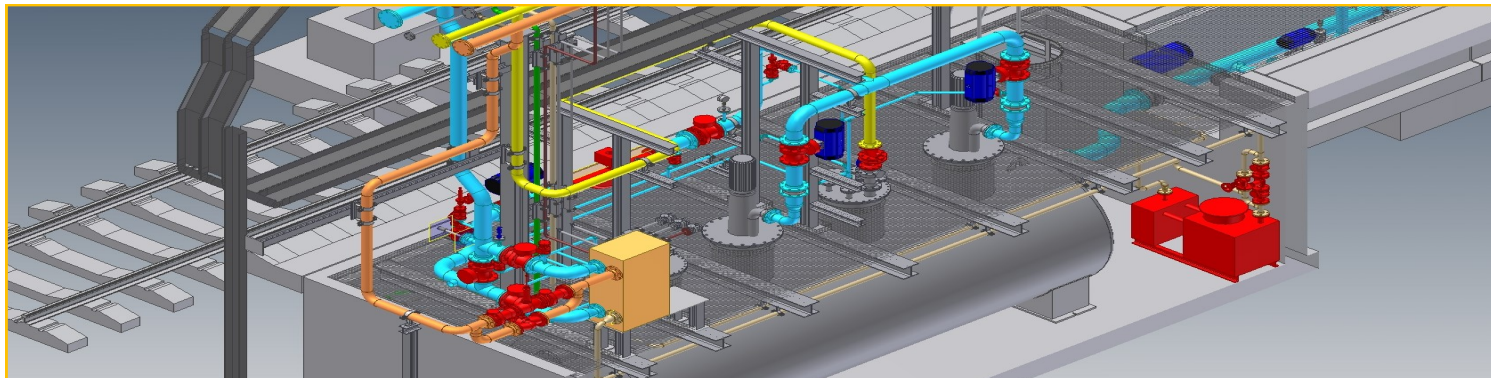
- Railcars
- Tank trucks
- Ships

for transshipment of:

- Light products (petrol/gasoline, diesel, jet fuel, etc.)
- Dark products (crude oil, bitumen, etc.)
- Chemical products (arenes, acids, etc.)
- Stable gas condensate
- Liquid gases (propane, butane, LPG, etc.)
- Biodiesel / Bioethanol

The scope of our services covers also the new construction and reconstruction of tank farms as well as peripheral components and systems such as:

- Vapor recovery units (VRU)
- Vapor pendulum systems
- Fire-fighting systems
- Product and pump systems
- Drainage systems
- Power-supply systems
- Automation technology
- Control and monitoring systems
- Product data logging
- Railroad lines



Railcar unloading systems

for the emptying of tank railcars in a fully-automatic or semi-automatic process

For more than 50 years, our company group has been engaged in planning and turn-key construction of handling and storage systems for liquid and gaseous products. Our customers include the mineral oil industry, the chemical industry and a number of other industries.

SCHERZER does not only plan and supply railcar unloading systems, but provides the design for the complete unloading system including all trades, such as automation, loading and unloading computer, data logging systems, piping systems, power supply, buildings etc.

In 1977, the first tanker railcar unloading system was planned and delivered by SCHERZER. Since that time, SCHERZER has planned, delivered and commissioned railcar unloading systems either under a specific contract or in connection with the construction of a tank farm.

One most modern facility is located in a tank farm in Poland (Ostrow Wielkopolskie / ORLEN). This plant is largely operated in a fully automatic way. Opening and closing of the dome, connecting the hose and opening and closing the manual valve on the railcar have to be carried out manually. The complete process up to the full unloading of the railcars is fully automatic. The connecting points are monitored by sensors; the valves and the frequency-controlled pump are controlled and monitored based on the filling level in the tank, using a PLC developed by SCHERZER.

Additional a new railcar unloading facility with a underground tank and a automatic tank discharge system was built in south of Germany by Dipl.-Ing. SCHERZER GmbH as a turnkey project. The advantage of this variant is that no vacuum can occur in the tank wagon. All tank wagons are connected to a underground tank by swivel joint unloading arm and the product is drained into the tank by the altitude difference with a control valve. Forwarding of the product will be handled by frequency controlled pumps depending to the tank level. This variant is also subject to the amount of different products.

Unloading systems for railcars and the associated automation equipment are designed in accordance with the respective local conditions and the customer's requirements.

Transfer stations consist of articulated steel tube loading units or hose systems with manual valves or sensor-controlled valves.

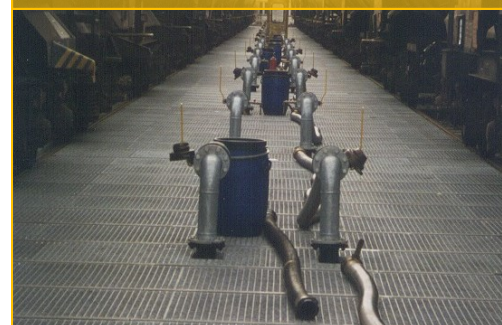
Products are filled into the tanks via a combined manifold system using controlled pumps.

The distributor may be emptied after each loading process using a residual discharge system.

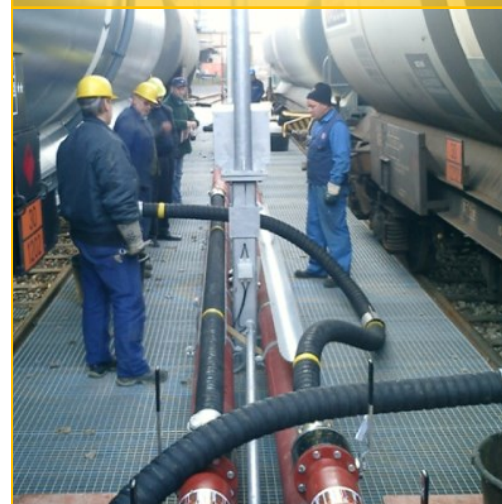
UNLOADING BY SWIVEL JOINT ARMS

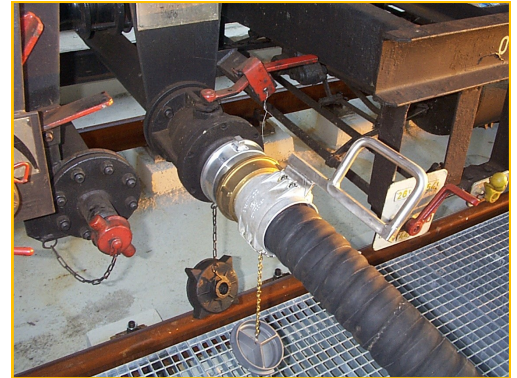


UNLOADING BY METAL PROTECTIVE TUBE



UNLOADING BY RUBBER TUBES



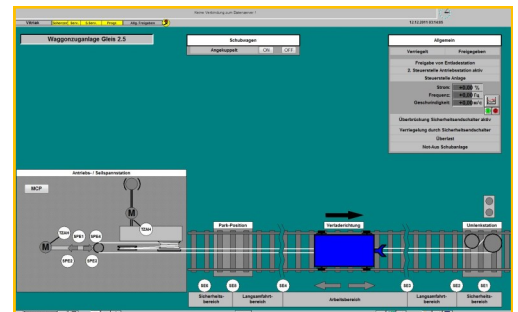
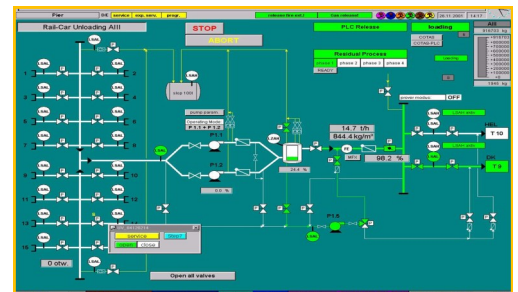


Railcar unloading systems can be supplied with a low level of automation, which will mean, however, that more personnel are needed at the unloading station.

On the other hand, near-complete automation is possible. After opening the dome cover (if no vapor pendulum system exists), connecting the unloading equipment, opening the bottom valve and activating a start button on the central control system or on the local panel, unloading is controlled in a fully automatic way and displayed in the control system.

The product unloaded is measured with calibrated equipment.

Measured data can be recorded via calibrated tank level measuring devices or via meters installed in the product line. In this way it is possible to measure and display the product flow.



Engineering and planning works

Tank railcar unloading systems require planning on different levels and for different trades. The most important trades involved are:

- Construction work
- Piping work
- Structural steel
- Automation and monitoring systems
- Data logging systems (temperature-compensated or weight-based)
- Fire extinguishing systems
- Track laying
- Grounding and lightning protection
- Cables and connecting lines
- Installation of materials supplied
- Residue discharge systems
- Pump stands
- Transformer stations

The decision about the extent of work has to be taken by the customer.



Take advantage of a facility from a **single source**:

From the first concept study, basic engineering, detail engineering, official application, civil and rail works, complete procurement and delivery as well as commissioning.



The tasks, related to railcar unloading facilities, performed by SCHERZER require the following relevant design and engineering works:

a) Determination of bases

- Determining the requirements for the solution of railcar unloading facilities.
- Clarifying the tasks for framework planning and stability verifications.
- Summarising the results.
- Selecting and inspecting similar objects.

b) Preparatory planning

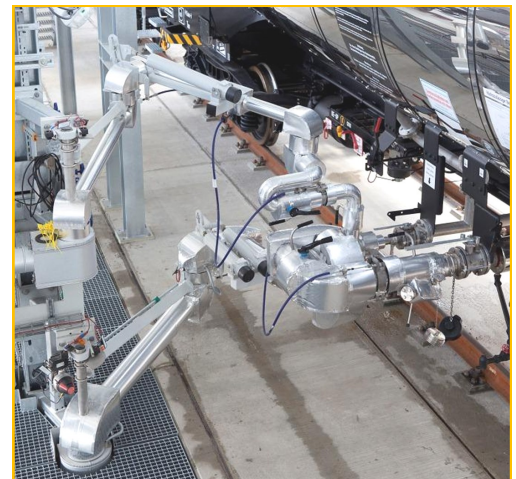
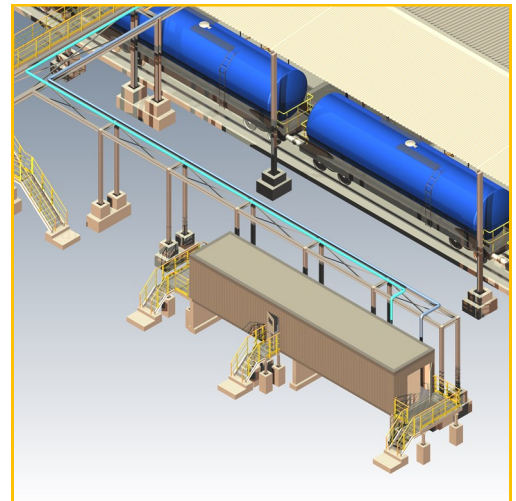
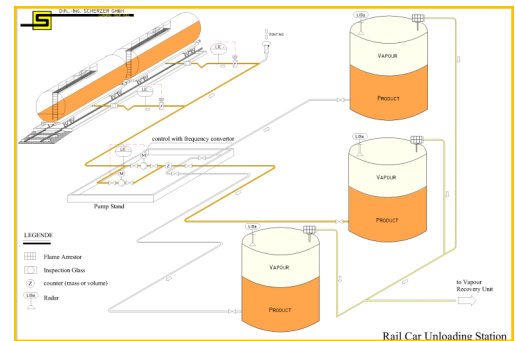
- Project and planning preparation, analysis of bases.
- Investigation of possible solutions for constructive and structural design, expedience, economy with due consideration given to environmental aspects.
- Preparation of the planning concept including alternative possible solutions as drawings and evaluation documents.
- Revision of the planning concept according to the requirements of the customer and authorities.
- Elaboration of the final cost estimates based on final preliminary planning.
- Compilation of the results of preparatory planning.

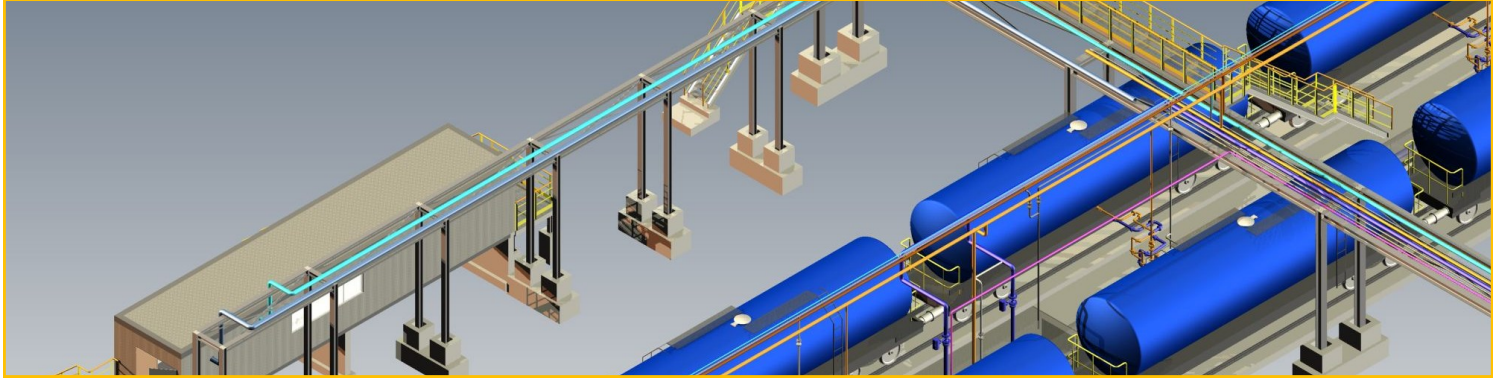
c) Design planning

- Preparation of the planning concept with due consideration of all specified requirements, with the assistance of other technical parties involved in planning up to the complete design.
- Elaboration of the explanatory reports.
- Drawings of the overall design.
- Preparation of a construction time and cost schedule.
- Summarising all design documents.

d) Approval planning

- Preparation of the documents for the necessary procedures of public law.
- Completion and adaptation of the planning documents.





e) Execution planning

- Incorporating the results from approval planning with due consideration given to all technical requirements and utilising the inputs of other technical parties involved in planning up to the solution ready for execution .
- Drawings and calculations of the object with all individual data necessary for execution, including detail drawings in the scales required .
- Preparation of the bases for the other technical parties involved in planning and integration of their inputs up to the solution ready for execution .
- Continuation of execution planning during the implementation of the object .



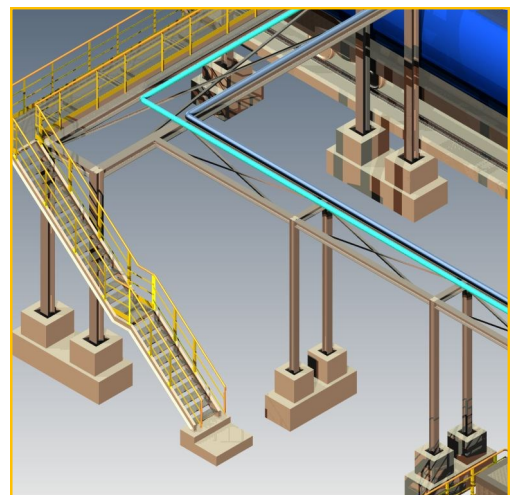
f) Construction supervision management

- Supervision of the local construction supervisors, co-ordination of the technical parties involved in object surveillance, in particular checks for compliance and release of the plans of third parties.
- Preparation and monitoring of a schedule (bar diagram).
- Subjecting the executing companies under delay.
- Acceptance of services and supplies together with the local construction supervisors and other technical parties involved in planning and object surveillance, preparation of a record of the acceptance results.
- Application for and participation in the acceptance by authorities.
- Handing over of the object including compilation and submission of the required documents, e.g. acceptance reports and test reports.
- Preparation of maintenance regulations for the object.
- Monitoring the tests of the plant parts and the overall plant for proper functioning.
- Listing the statutory periods for warranty claims.
- Determination of costs.
- Cost controlling.



g) Documentation

- Compilation of the drawings and calculation results of the tank yard on completion, As-Built documents.
- Compilation of plant certificates, operating manuals, maintenance and repair manuals as well as approvals of authorities for the operation of the tank yard.
- Manuals and release of the overall project.





Design of unloading systems:

The following parameters are defined before the start of planning:

- ◆ Products
- ◆ Temperature ranges
- ◆ Maximum flow rates
- ◆ Loading times
- ◆ Flange connections
- ◆ Working areas for unloader / hoses
- ◆ Design type (articulated loader / hoses)
- ◆ Fail-safe systems
- ◆ Flange distances
- ◆ Sampling devices
- ◆ Type of data logging
- ◆ Video systems

Design of measuring sections and data logging systems

For measuring sections, the following parameters are specified before the start of planning:

- ◆ Products
- ◆ Temperature ranges
- ◆ Maximum flow rates
- ◆ Calibration requirements for measuring sections
- ◆ Billing of volume VT / weight
- ◆ Meter systems and types
- ◆ Nominal pressure stages
- ◆ Control valve systems and types
- ◆ Full and empty systems

Design of piping and valves

For piping and valves, the following parameters are specified before the start of planning:

- ◆ Products
- ◆ Temperature ranges
- ◆ Maximum flow rates
- ◆ Valve systems and types
- ◆ Nominal pressure stages
- ◆ Flange design
- ◆ Scope of supply and services
- ◆ Acceptance tests

Design of fire fighting systems

The following parameters are specified for fire fighting systems before the start and planning and are required for processing the order:

- ◆ Fire protection and fire water containment
- ◆ Fire extinguishing medium
- ◆ Temperature ranges
- ◆ Fire fighting areas
- ◆ Requirements imposed by local fire brigades
- ◆ Acceptance tests
- ◆ Selection of fire protection equipment

Design of fail-safe systems

For fail-safe systems, the following parameters are specified during the planning phase.

- ◆ Selection of fail-safe systems
- ◆ Selection of signal systems
- ◆ Requirements imposed by local authorities
- ◆ Scope of deliveries and services for the systems



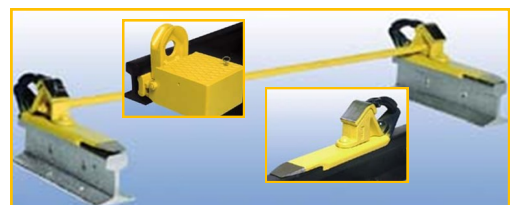
All works performed in the danger zone of the tracks requires a previous careful planning.

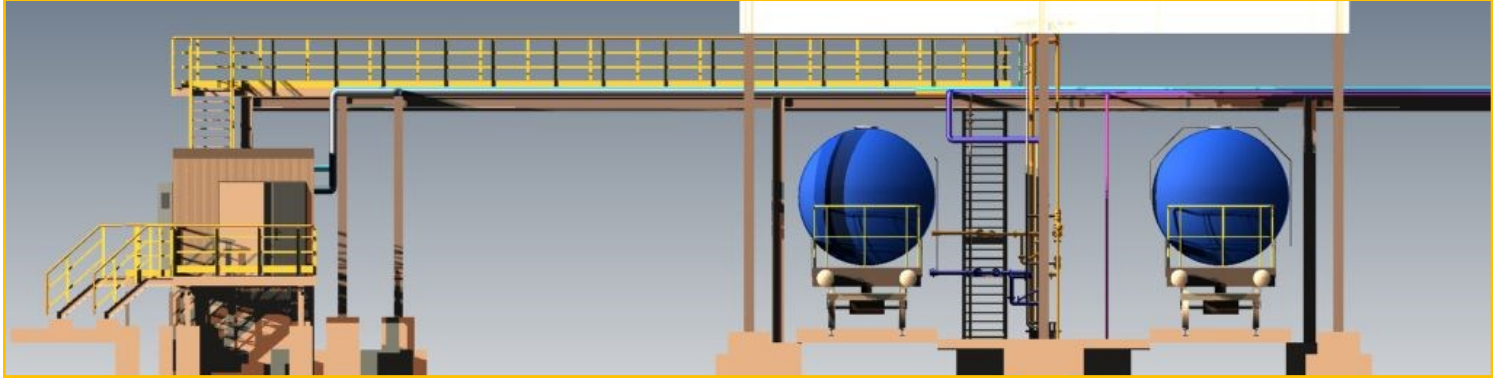
This also refers to the railcar unloading facilities integrated in the track system. The considerations which are necessary for the planning of the work must not only confine themselves exclusively to the actual execution of the work, they also must take into account the accompanying safeguarding regulations.

Necessary safeguarding regulations are often recognized insufficiently and are not included in the budget.

Before the beginning of the work, essential criteria, such as local difficult conditions, suddenly turn out not to be taken into account.

This omission then must be cleared with additional effort.





Fire protection and fire water containment

Fire fighting attack routes have to be designed and marked in such a way that discharge points can be easily and without obstructions reached by fire fighting and rescue vehicles.

For filling and discharge points for flammable liquids, location and width of fire-fighting attack routes shall be specified in accordance with DIN 14 090 taking into account local and operating conditions and in agreement with the authorities in charge of fire-fighting.

For filling points subject to a specific permit, a current fire-fighting plan for structural works in accordance with DIN 14 095 and fire protection regulations in accordance with DIN 14 096 must be in force.

Fire fighting equipment shall be available to fight fire outbreaks. In this context, reference is made to the Regulation ASR A2.2 “preliminaries against fires”.

Selection of fire-fighting equipment

Type and extent of fire fighting equipment shall be based on local and operating conditions, in particular the filling rate and the hazard class of flammable liquids.

In addition, suitable facilities e.g. fire alarms shall be provided to report the fire to the competent fire brigade. Otherwise the fire fighting system must be such that all hazards can be effectively dealt with.

Depending on local and operational conditions, fire fighting equipment may be stationary, fully movable or partly movable.

Partly movable fire fighting systems include mobile fire trucks or engines that are equivalent to stationary fire-fighting systems with regard to the extinguishing medium rate and storage as well as the alarm concept and the response time.

Fire fighting media include: foam, carbon dioxide, powder and water.

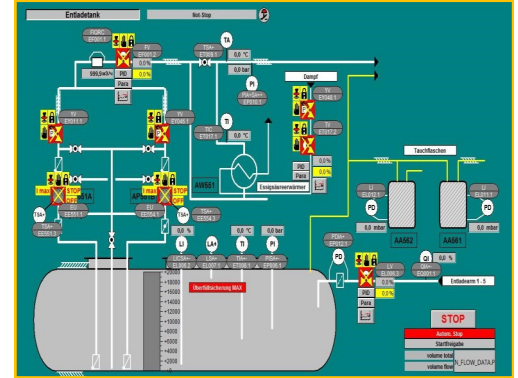
Carbon dioxide and powder may not be introduced under pressure into an explosive atmosphere (e.g. for inertization or testing the fire fighting system), unless specific protection measures have been taken. Reference is made to the regulations BGR 132 issued by the trade associations concerning the avoidance of ignition hazards due to electrostatic charges.

Fire water containment

The need for fire water containment shall be examined for each individual filling and discharge point in cooperation with the competent fire fighting authority; the containment volume shall be defined if applicable.

Fire water containment facilities are, for instance, not required, if the expected share of fire water and flammable liquids is so low in the case of fire, that it can be absorbed by the existing containment facilities.





Automation and monitoring systems

For automation systems, the following parameters are specified before the start of planning.

- ◆ Interfaces
- ◆ Signal exchange with customers
- ◆ Remote maintenance via telephone
- ◆ Type and scope of automation
- ◆ Specification of the automation system (PLC and control systems)

Equipment for process control systems

The entire process is controlled and visualized by process control systems (such as WinCC from Siemens) und PLC systems.

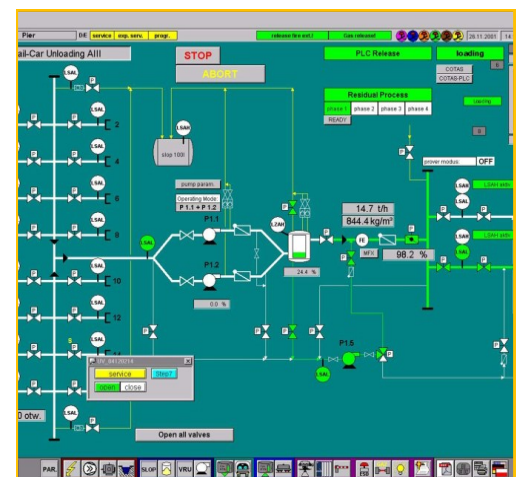
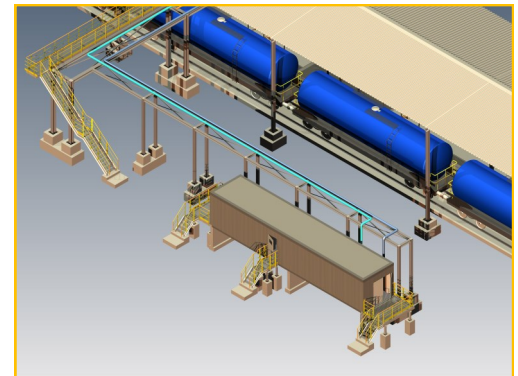
- ◆ Server/client based process control system with centralized data storage on the basis of Windows operated computer systems
- ◆ Setting up redundant systems
- ◆ Process interfacing of PLCs (e.g. Simatic S7 from Siemens) via bus systems (Industrial Ethernet or Profibus)
- ◆ Integration of tank farm management systems, quantity measurement systems approved by the Board of Weights and Measures and ID card reading systems in the overall design
- ◆ Connection of tank measuring equipment (e.g. radar level measurement systems) with OPC (OLE for Process Control)
- ◆ Integration of process signals in the PLCs via standardized field bus systems (Profibus-DP, Profibus-PA)
- ◆ Interfaces to third-party systems and their integration (to the extent possible) in process automation via standardized or user-specific protocols (e.g. Profibus, Modbus, 3964R, RK512 or others)
- ◆ SAP interfaces for the loading computer systems and customer-specific adaptations are possible.

Process visualisation

Subordinate systems (e.g. railcar filling and discharge points, VRU systems, handling and mixing facilities) will be equipped with subordinate machine-oriented operating and monitoring systems based on Windows-operated computer systems.

Visualization and process operation in visualization images designed specifically for this process.

- ◆ Specification and verification of process parameters
- ◆ Alarm visualization, alarm logging and alarm archiving
- ◆ Integration of subordinate process visualization systems in the process control system





Environmental protection and safety

The following safety parameters are specified before the start of planning.

- ◆ Type and extent of track ballast protection (spill containment pans, in-situ concrete)
- ◆ Safety analyses
- ◆ Requirements derived from TRGS 727/TRGS 2153, TRBF and authority regulations

Spill containment systems made of in-situ concrete or rail load bearing elements

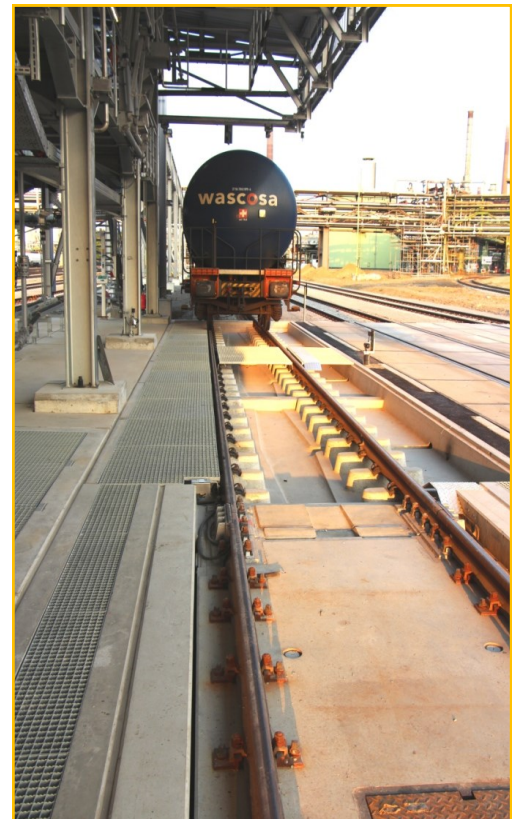
The collection in inside railcar unloading stations are made by in-situ concrete or as pre fabricated stations / rail load bearing elements.

During handling, filling, production and treatment of hazardous products for the chemical industry, in transfer stations, filling stations or tankfarms as well as locomotive fuel stations it has to be secured that these products are not contaminating groundwater.

Rail load bearing elements are pre fabricated concrete elements for collecting and draining of water hazardous products in rail areas and therefore protecting ground and waters.

For this purpose, the collecting trays can be provided with a concrete coating. The components can be installed within a very short time.

The low-porous raw concrete surface allows a high degree of impermeability and ensures a controlled drainage of the collecting area. An exact cost calculation in advance, reliable scheduling and the coordinated logistics guarantee that you do not take any risks during construction.





Training, supervision and commissioning

Training, supervision and commissioning is performed by highly qualified specialists of Dipl.-Ing. SCHERZER GmbH.

In-house training is generally combined with the function – test of the facility. Therefore it is secured that training activities are performed directly at control systems of the facility. During training, substantial functions are explained as well as the complete engineering system such as tag number system, circuit diagram etc.

Our specialists of supervision are sub – classified regarding Mechanic, earth work and foundations, electric and MSR. Further a Chief supervisor for coordination and as the contact person for the customer is foreseen. Detailed schedules and organization sheets and plans for supervision and commissioning are worked out.

After Sales Service

Our After Sales Service are performed by the specialists of our subsidiary company SCHERZER Umwelttechnik GmbH.

Maintenance contracts can be settled directly and will be split between mechanical section and EMSR. Short term fault analyses are carried out by a remote diagnosis with VPN or modem connection for a quick solution of problems.

Various references:

1992 / 94 Reederei Dettmer GmbH & Co. / Magdeburg (Germany)

Engineering and site supervision for the complete construction of a tank farm in Magdeburg.

2000 PKN Ostrow / Polen

Engineering and supply of a tank farm, in detail: Tank equipment, tank truck loading, VRU, rail car unloading, fire fighting system, complete automation system as a turn key project.

2002 Total / Heilbronn

Railcar unloading facility for AIII products incl. authority approval, specification and site management.

2009 RWE/DEA / n.n.

Concept study for building a railcar unloading station

2011 n.n. / Germany

Turnkey construction of a railcar unloading facility for hazardous products.



Our clients:

AGIP GmbH, Angarsknefteorgsintez, ARAL AG, AVIA, Bayer AG, Bayernoil GmbH, BP / TNK, BP Oil Grangemouth Refinery, Brenntag AG, BSL BUNA Werke, Ceska Rafinerska S.A., Cheming, Chemo-petrol S.A., Conoco, CPI, DEFROL GmbH, Deutsche BP AG, Deutsche Solvay Werke AG, DHC - Solvent Chemie GmbH, Didier AG, Donau Chemie AG, ELF OIL AG, Erdölraff. – Ingolstadt AG, Erdölraff. - Neustadt GmbH&Co., ESSO AG, FINA GmbH, Jugopetrol, Grupa LOTOS, KINEF, Leuna - Raff. ges. mbH, Lukoil, Lukoil Neftochim Bourgas, Lurgi Life Science, Mannesmann Anlagenbau AG, Mazeikiu Nafta, Melcher GmbH, Mider, MIDEX, Migrol, Mineralölraff. Dollbergen, Minol AG, MIRO, MOL, N.I.O.C. - Kala Naft, Nizhnekamsk Raff., Novatek, Ölhafen Rostock, Omni Tank GmbH, ÖMV, ORLEN, Orsknefte-orgsintez, PCK-Schwedt, Petrochemia S.A. / PKN, Petrogal, Porta Petrol S.A., Raab Karcher GmbH, Raffinerie Vohburg, Reederei Dettmer GmbH&Co., Rosneft, Ruhr Öl GmbH, Ruhrtanklager Käufer GmbH, Rusneft, Rüttgers Werke AG, Seehafen Rostock, SHELL Dtl. Oil GmbH, Slavneft, Slovnaft, Solvay, Sonacop, South Ural Company, Total, VA Tech, VEBA OEL AG.



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Other brochures of Dipl.-Ing. SCHERZER GmbH

- Company profile
- Railcar – Loading systems
- Railcar – Unloading systems
- Railcar – Filling tube and Hydraulic systems
- Options for SCHERZER filling tube systems
- Study to compare Rail Tank Car ON-SPOT loading systems with serial loading systems
- LPG Loading– and Unloading systems
- Tankcar - Loading– and Unloading systems
- Ship - Loading– and Unloading systems
- Tankfarms, including handling plants and Vapor recovery units (VRU)
- Reference lists

We are pleased to send you our brochures on request.