Trackguard® Cargo MSR32

Greater efficiency and safety in cargo transport
Description of challenge

Cargo transport by rail will always be an alternative to road transport if goods need to reach their destinations more quickly, more reliably, more punctually, economically and environmentally friendly.

To this end, Siemens has developed the Trackguard MSR32 microcomputer system for marshaling yards — a modular, open microcomputer system which supports adaptation to various performance requirements.

This solution is in use at many shunting and marshaling yards in Germany and in other countries.
Cargo Automation international

Marshalling and shunting yards in Europe – selected examples
Cargo Automation
Trackguard Cargo MSR 32 RaStw marshaling yard interlocking

- Signaled shunting operations in secondary or stabling areas with protected shunting routes
- Operation and control by a pointsman or signalman
- Possibility of completion by terminal planning and train describer systems
- Interfaces to adjacent interlockings
- Monitoring of gates and handling equipment in the route
- Safety according SIL2
Cargo Automation

Trackguard Cargo MSR32: control and display system

Operator console

ABAS track diagram

ABAS (control and display system)
Cargo Automation – Reference
Trackguard Cargo MSR 32 RaStw marshaling yard interlocking

Customer
German Railways (DB AG)

System data
87 sets of points, 80 shunt signals, 9 main signals (Ks),
12 decentralized electric points (DEP)

Operational requirements
Running on protected shunting routes, incoming and
outgoing cargo trains, DEP humping and zigzagging

Trackguard Cargo MSR 32 equipment
Route controller for shunting cargo trains on entry and exit
routes, central operator console, link to the Krf relay
interlocking, DEP area with route control panel for humping
and zigzagging

Upgraded
June 2007 to June 2009

Kornwestheim Marshaling Yard, „Krw“
Cargo Automation
Trackguard Cargo MSR32: training system

- Training on system with original project-specific engineering data
- Staff training on a system with real-time behavior
- Training of staff is independent of operational time at the yard
- Dangerous situations can be generated and operated without causing any problems
- Follow-up training of different user groups will be simplified.
Switchguard® DPC – IntelliYard

Intelligent management of marshaling yard operations with decentralized electric points
Switchguard DPC – IntelliYard
System overview

Route control panel

Local shunter with smartphone or tablet

Left fouling point wheel detector 1/point entry wheel detector 2

Decentralized electric points 1

Point entry wheel detector 1

Right fouling point wheel detector 1

Power supply
Switchguard DPC – IntelliYard
Interactive operation of track infrastructure

Decentralized electric points

- DEP control by compact means via a radio link
- Local control using wireless buttons or a handheld device
- Control via a dispatching desktop user interface
  (e.g. web browser)
- Clear/occupied indications via wireless wheel detectors
- DEP basic functionality and route setting
- SIL 2

IntelliYard modules

- DEP point controller
- Route controller
- Wireless wheel detector
- Switchguard DPC
- Trackguard Cargo SRC
- Clearguard WWS
Switchguard DPC – IntelliYard
System configuration with Wireless Sensor Network WSN

- WWS: Wireless Wheel Sensor
- WSN: Wireless Sensor Network
- DPC: Decentralized Point Controller
- SRC: Shunting Route Controller
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Applications

- The DEP controller is fully accommodated in the housing of the point position indicator.
- Long-life white or white/blue LEDs indicate the point position.
- All functions of a standard DEP are configurable in line with the requirements stipulated by the rules of German Railways and the Association of German Transport Undertakings (25km/h, driving on visibility,…).
- Reversal protection using double wheel detectors is already integrated.

S 700 point machine with a compact DEP controller in a point position indicator, connected by radio via the WSN.
Switchguard DPC – IntelliYard
Applications

- The Clearguard WWS module reliably detects and safely transmits wheel detector signals.
- The information is transmitted via protected radio links.
- The evaluation circuits for the wheel detector signals are equipped with solar panels for independent power supply.
- Cables to wheel detectors and other control elements are not required.
- SIL 2
Switchguard DPC – IntelliYard

Control elements

- Wireless, radio-based connection of decentralized energy self-sufficient components and higher-level systems
- Advanced control point with wireless post-mounted buttons
- Point control panel
- Route control panel

Control elements link up to the WSN by radio via an energy self-sufficient WSN gateway (edge router)
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Mobile route selection using handheld devices

- The route is selected wirelessly using handheld devices, e.g. smartphones.
- An appropriate representation of the DEP area is shown on the display.
- The DEP route is selected by a touch control operation on the relevant destination track.
- A route can only be requested by operators who have been registered for this function on the DEP route controller.

DEP route control using the Trackguard Cargo SRC mobile GUI
The Trackguard Cargo SRC shunting route controller has been implemented as a server solution.

The DEP routes are configured on a server computer.

When a route is requested, the route controller determines the associated points and required point positions.

The setting requests are sent to all Switchguard DPC point controllers involved.

The point controllers send an acknowledgment to the route controller.

The point status is analogously indicated on the point position indicator.
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Benefits of framework

**Integrated solution**
- Freely configurable from independent, compact modules
- No specific IT systems required by the user due to a server concept
- Online access via a PC or mobile terminal devices
- Standard, consistent operating concept
- IntelliYard functions complement each other optimally

**Wireless connection of wheel detectors**
- Easy and fast installation
- Energy self-sufficient, no cables required
- Wireless radio link
- Minimum investment costs
Controlguide® Arkos
Greater efficiency and safety in cargo transport

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Cargo Automation

Controlguide Arkos Basic: method of resolution

- Recording of wagons and checking of their sequence in the train by means of axle patterns, optionally also by means of axle loads
- Detector arrangement in the track comprising one or more wheel detectors and, optionally, load measurement equipment
- Independent of ambient conditions and equipping of wagons
- Method of determining wagon sequence and lengths
- Verification of announcement data
- Basic solution for automatic inbound checking before the train arrives
Cargo Automation – references
Identification system Controlguide Arkos Basic

- **Customer**
  Austrian Federal Railways (ÖBB)

- **Basic task definition**
  Management of resources and control of operations in the marshaling yard

- **Functions**
  Automatic composition check, weight sensing and wheel-diameter determination with Arkos

- **Controlguide Arkos equipment**
  Controller module with coupling to terminal planning system Controlguide Vicos CM 500, double contact configuration with weight sensing device in inbound tracks

- **Commissioned**
  2006

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