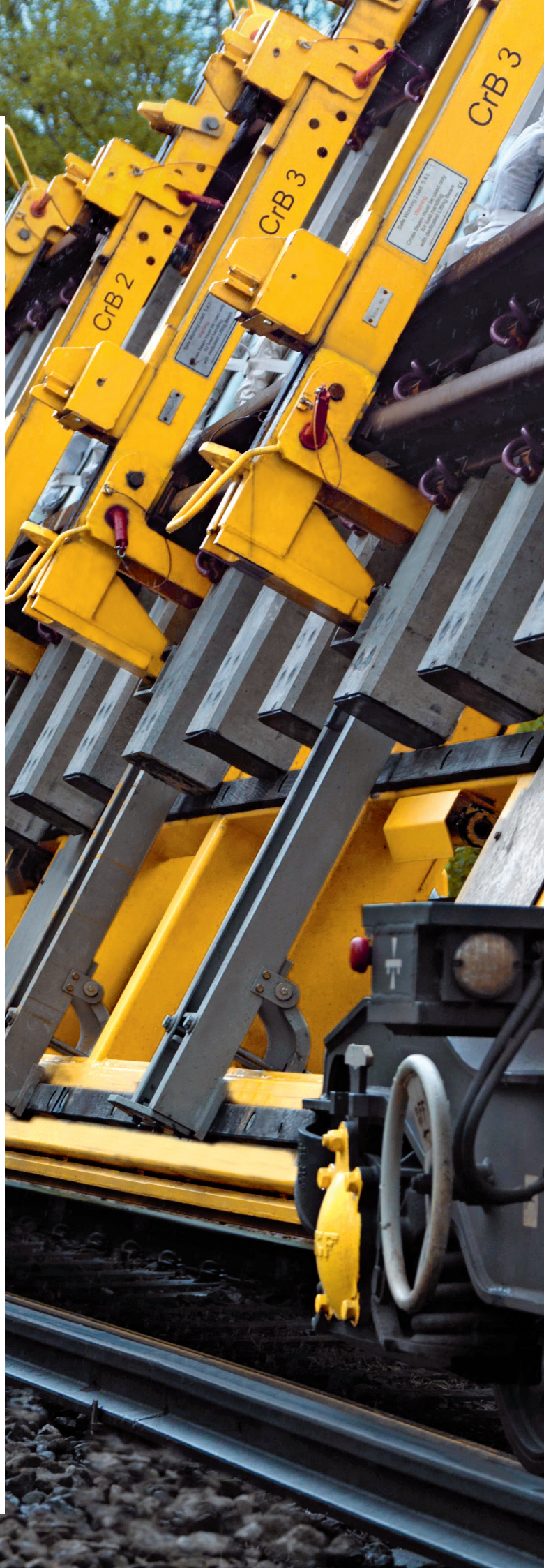
SWITCH TILTER **UK-WA6 / TSI-UIC**

SWITCH AND CROSSING
TRANSPORT WAGON



KIROW

↑
Unloading a switch section from the Switch Tilter in England

THE SWITCH TILTER.
THE MODERN SWITCH & CROSSING TRANSPORTER.

SPEED, PRECISION AND EFFICIENCY
IN EVERYDAY RAILWAY ROUTINES: THE PERFECT
TRANSPORTER FOR POINTS RENEWALS.

The switches also called turnouts or points and crossings make a rail infrastructure a network. They enable a smooth transition from one track to another without interrupting the journey. Approximately two thirds of the turnouts in the Central European network are on main tracks and are correspondingly frequently crossed and thus subjected to stress. Accordingly, these switches and crossings don't last forever. While individual parts can be replaced on reaching wear limits, after about 25 years in position the whole set of points has to be replaced. That means: across Europe every year thousands of points must be renewed.

↑
Points represent the heartpiece of the railway network

There are two main obstacles existing:

1. The transport to the installation location is a big challenge. The length and width of a set of points exceed the limits for road and rail transport. Thus it is customary to break the switch and crossing down into transportable segments, whereby the segment size is determined by the means of transport and the capacity of the lifting gear.

2. Points renewals have to be completed under immense time pressure. During the renewal at least two tracks are impassable – in times of high-speed logistics a considerable economic problem.

→INFO

In this context, what constitutes the best switch and crossing transport wagons today? What are the specific requirements when special switch and crossing segments need to be transported to the renewal site?

Essentially:
- high performance
- safe operation

More precisely:
- maximising the size of the point segments
- low height of the loading platform
- loading and unloading without climbing on the loading platform
- significant lateral displacement to keep adjacent track free, operation in superelevation and support of crane operations
- optimised set-up and set-down
- short possession times, least possible disruption of traffic on adjacent tracks

We developed the Switch Tilter to meet exactly these requirements.

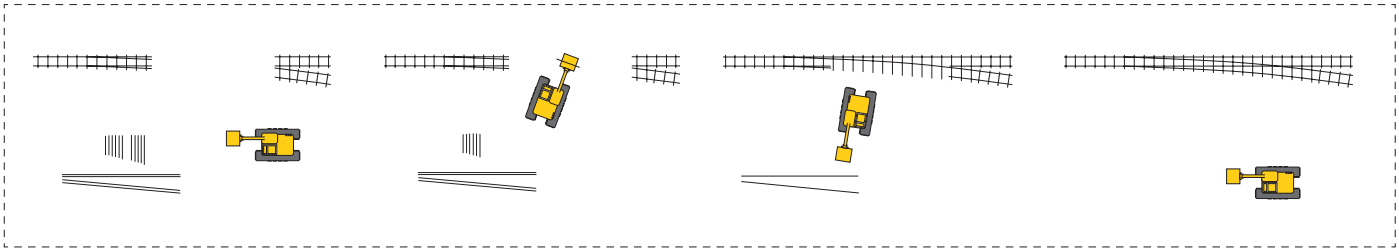
MODERN GERMAN ENGINEERING: **THE SWITCH TILTER** SETS STANDARDS IN PRECISION AND LOGISTICS INTELLIGENCE.

Historically, four methods for points renewal work have prevailed. Factors such as local conditions, location and concept of the turnout factory, logistics costs and available machines for laying the switches and crossings play a role.

Unmistakably, the intelligent use of switch and crossing transport wagons is greatly increasing in significance.

Countries such as Switzerland, Great Britain, Belgium, Sweden, Austria, Germany, Serbia, Russia, Finland, USA, Australia and South Africa already rely on them.

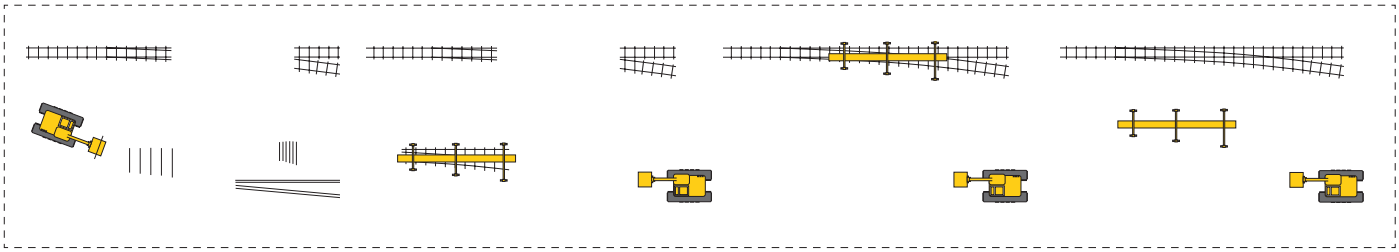
POINTS RENEWAL METHODS:



→IN SITU:

Delivery of rails, sleepers, points linkage and points drive to the site, then assembly of all parts of the switch and crossing at the renewal location. To this end, specialists must travel to the renewal site and assemble the switch on the ground under difficult conditions and extreme time pressure:

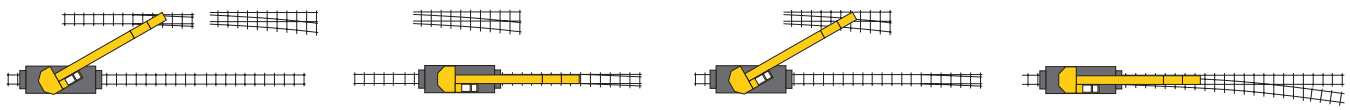
- very long possession times
- high costs to reach the required quality
- high transportation and personnel costs



→ASSEMBLY AREA:

Pre-assembly of the set of points from individual parts or small segments at an assembly area near the renewal site, then installation of the large switch sections or the entire set of points. Here, too, specialists have to travel and assemble the set of points in the field, but without the huge time pressure of in situ assembly.

+ short possessions times
- Quality depends greatly on the laying procedure
- high costs for personnel and equipment
- additional assembly site costs (rent, equipment, dismantling)

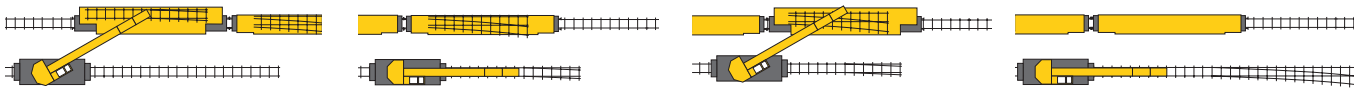


→PANELS:

Pre-assembly of the set of points at the turnout plant and transport of segments and parts to an interim storage location in the vicinity of the site, then renewal of the switch and crossing:

+ short possession times
+ high quality
+ low costs

however:
- additional expense and effort required for prior unloading and storage location



→SWITCH TILTER:

Pre-assembly of the switch and crossing at the turnout plant and division into large segments that are brought to the renewal site by transport wagons and then laid directly into place from the wagon. The pre-assembled large parts including points drive and installations remain intact and can be joined together and commissioned quickly and in high quality:

++ very short possession times
++ very high quality
++ very low costs

↑ Just one operator starts the Switch Tilters

↑ Tilting down the loading platform

↑ Crane crossbeam is linked with the points section

↑ Transporting the switch section to the renewal site

↑ Installation of the points section by the Multi Tasker

THERE ARE MANY REASONS FOR CHOOSING THE **SWITCH TILTER**. THE MOST COMPELLING ARE:

One operator for all Switch Tilters

01 THE BASIC TECHNICAL CONCEPT OF THE SWITCH TILTER

It sounds very simple: the Switch Tilter's loading platform is tilted up by hydraulic cylinders for transport – and tilted down for loading and unloading. Here we strive to fully exploit the loading gauge profile – by integrating the curve constraint in the function of the loading length. Thus there are differing maximum load widths, such as e.g. in UK W6A 3.7 m; with UIC GA 4.25 m or with UIC G2 4.6 m. So loading length and maximum load are optimised as a function of curve restraint and maximum permissible axle load. Together with our customers we always develop a special concept for this, tailored to the type of points to be transported. So we can increase the loading length, for example, by the mounting of platform extensions. In this case the lengthened loading platform extends beyond the wagon length, a special draw bar connecting system at both ends of the wagon nevertheless allows the maximum load width.

Minimised loading height guarantees transport under overhead lines

02 THE RAILWAY COMPONENTS

The choice of railway components such as bogies, wheel sets, brakes, couplers and drawgear depends on customer requirements and the applicable regulations (e. g. TSI). All structural analyses are done in accordance with current internationally accepted standards. Of course we can always adapt them to regional requirements. And certainly we provide all necessary documentation for Engineering Acceptance, such as gauge calculation, brake calculation and derailment safety calculation.

03 THE MINIMISED LOADING HEIGHT

Special design emphasis is put on achieving a minimal loading platform height, which allows loading and unloading operations under overhead wires. For our customer Network Rail, for example, we achieved a loading platform height

of only 1.4 metres. To perform this we used special bogies and wheel sets with a small wheel diameter and also minimised the heights of wagon frames and loading platforms.

04 LATERAL DISPLACEMENT

One Switch Tilter option is lateral displacement of the loading platform. We can integrate it for regulation of the centre of gravity and to keep the adjacent track clear. Integrating lateral displacement in the loading platform saves height and achieves a side shifting capability of 1200 mm. Thus the adjacent track can be kept clear in any track situation. Lateral displacement is also important to shift the loading platform closer to the crane on the adjacent track. Thanks to the smaller lateral outreach, in many cases the crane requires no propping, thus saving valuable installation time.

↑
Diesel engine and local control panel

↑
Lateral displacement

Also noteworthy:
The lateral displacement can be combined with the tilt in such a way that the Switch Tilter's centre of gravity including the load always remains in the area of stability, enabling you to work well even in superelevation.

05 THE POWER SUPPLY

Every Switch Tilter has its own power supply. This means in case of malfunction, redundancy to the adjacent wagon can be established.

06 OPERATION

All locking elements of the Switch Tilter work hydraulically. Thus no manual work is involved in setting up the transport position or the loading and unloading position. The setup process is completed within minutes by pressing the appropriate buttons. Operations can be done alternatively on the local control panel or by remote control. This guarantees maximum safety at all times.

↑
Wireless remote control

↑
Storage of the remote control

THE TASK: NO WORK ON THE LOADING PLATFORM. **THE SOLUTION:** THE SWITCH TILTER UIC.

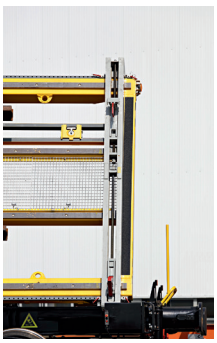
FOCUS ON THE CONCEPT FOR LOAD FIXING, LOADING AND UNLOADING OF THE SWITCH TILTER UIC

SECURING THE LOAD

The developments in modern-day railway construction continuously challenge the operators with stricter requirements concerning work safety. With this trend in mind we have developed solutions, which revolutionize the load fixing system for switch tilting wagons.

The crucial advantage – the operation is only done from the ground. For this purpose, slidable fixing hooks have been integrated in the crossbars, Connecting Beams, of the switch tilting wagon. Additional challenges arise from the necessary flexibility of the load fixing system. If, for ex ample, a large number of different types of points are to be loaded and the return of the old points is also planned, it requires a system for load fixing, which is as universal, quick and easy to operate as possible.

The manual-mechanical load fixing system that our customer Vossloh Logistics selected, fulfils these requirements without exception. The Connecting Beams can be easily repositioned and turned on an angle – depending on the layout of the switch to be loaded. The platform height was minimised to 1.6 m to realize easy operation from the ground. A well-planned system which has been developed together with experienced practitioners, entirely in line with the Kirow philosophy.



Manually movable and turnable Connecting Beams

Kirow Switch Tilter with manual-mechanical load fixing system for Vossloh Logistics

Manual Operation of the load fixing system from the ground

→INFO

Typically Switch Tilter:

- operable across borders: thanks to TSI certification
- extremely safe: due to radio remote control and clever load fixing systems. All operational steps can be carried out from the ground
- highest quality: owing to gentle transport of the pre-assembled switch sections directly from the factory to the construction site
- wide range of application: as a result of maximising the possible size of switch segments for transport and minimising the lifting height

LOADING AND UNLOADING

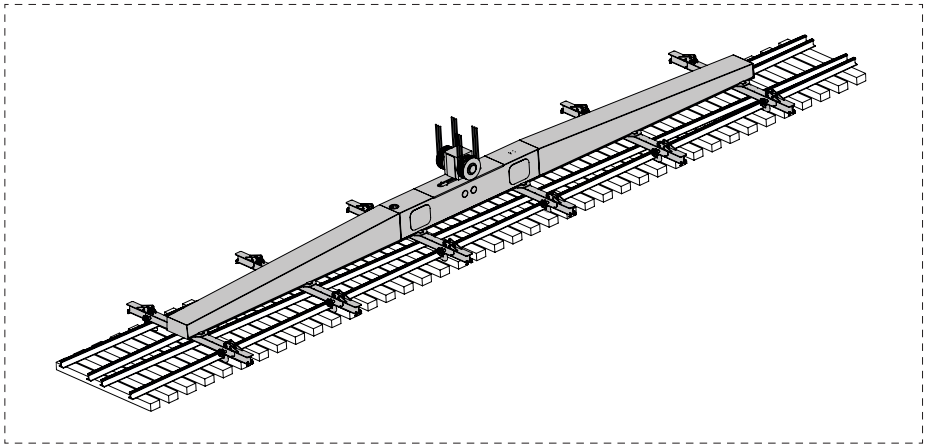
Kirow has an in-depth knowledge of the various types of lifting equipment used for loading and unloading the Switch Tilter and of laying the switch sections.

KIROW SWITCH HANDLER

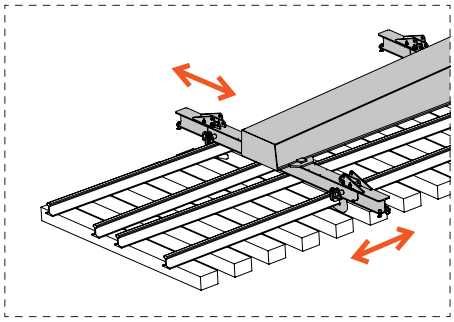
When working with the Kirow Multi Tasker and the Kirow Switch Tilter the lifting beam system, Kirow Switch Handler, is the perfect link. It becomes a perfectly harmonised system, which makes turnout replacement smoother, more time-efficient and safer.
The Kirow Switch Handler features a hook shifting device, which allows for the easy and quick horizontal positioning of the lifting beam with or without payload. Additionally, the longitudinally shiftable crossbars with integrated load hooks are used for the direct and gentle loading of switch segments.
The distance between the crossbars can be adjusted depending on the distance between the bearers by using hydraulic cylinders. This guarantees that the load hooks can easily reach the segment from under the rail foot in any situation.
The shifting functions of the crane hook and the crossbars are operated by a radio remote control.

During unloading of the switch tilting wagon, the load hooks can be easily pushed under the rail between the bearers from the ground. The dangerous work on the loading platforms is eliminated. Operation from the ground makes working procedures quicker and safer, precious time is saved during the possession periods.

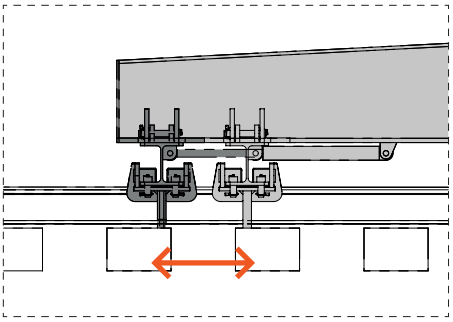
The utilization of the KIROW Switch Handler makes the handling of switch segments significantly easier. Loading by integrated load hooks combined with the possibility of always quickly and easily levelling the lifting beam horizontally, minimises the necessary lifting height. A decisive advantage for working under overhead catenary or in tunnels.



Kirow Switch Handler



Adjustable crossbars and load hooks of the Switch Handler

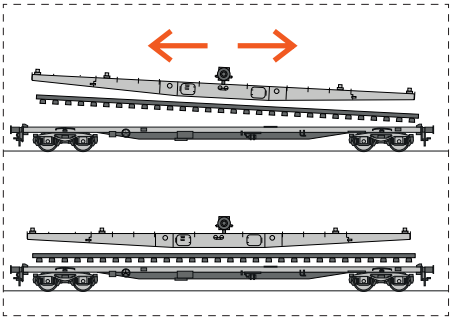


Hydraulic shifting function of the crossbars

→INFO

Typically Switch Handler:

– highly productive and fast operation due to easy load levelling with hook shifting



Hook shifting device of the Switch Handler for horizontal positioning

Switch segments can be directly fixed to the Switch Handler using the integrated load hooks

Pushing the load hooks in position from the ground

THE AIM: RADICAL TIME SAVINGS AT SWITCH AND CROSSING RENEWALS. **THE SOLUTION:** THE SWITCH TILTER FOR NETWORK RAIL.

THE SWITCH TILTER FOR NETWORK RAIL AT WORK.

Cross and Connecting Beams fix the loaded switch section on the Switch Tilter

A specific case study of how we adapt the Switch Tilter to specific needs, such as country-specific conditions:

The UK network owner Network Rail has an ambitious goal with its "Modular Switch Project". It wants to reduce the time for points renewal radically with the help of the Switch Tilters successfully in operation since 2009. The new "Modular Switch" strategy has two phases:

Phase 1: Develop switches and crossings with segmented long bearers (split bearers) to allow transport on the narrow W6A gauge.
Phase 2: Acquire switch and crossing transport wagons which can carry the up to 3.7 m wide switch sections.

In addition, we have developed a special load fixing and handling system for Network Rail. Using this system the switch sections can be both, lifted and transported with the cranes as well as fixed and released on the switch and crossing wagons – without manual attachment work on the wagon. This is a milestone in the improvement of working safety.

The specially developed crossbars, Cross and Connecting Beams, are the key element of this system, with them the switch section is hydraulically locked

Switch Tilter folding down

onto the Switch Tilter and lifted by means of a special lifting beam. Very gently, hanging freely, i.e. without inducing diagonal, bending or torsional forces.

(The hydraulic centre of gravity compensation in this lifting beam also saves valuable time during attachment, because the switch section can be brought into a horizontal hanging position by pushing only a button.)

The switch section can thus always easily be kept horizontally. This reduces the lifting height required and facilitates the precise placing of the switch section in the installation location. Securing of the switch part on the loading platform, incidentally, is carried out with hydraulically driven locking wedges. This means the securing of the load, but above all releasing the load, occurs at the push of a button, so unloading on site is completed within minutes.

Conclusion:
The switch and crossing components are manufactured at the factory under optimal conditions and then equally optimally, namely extremely gently, transported on the Switch Tilter. So the points sets can not only be laid with absolute precision and quality. But also without costs for extra assembly areas near the switch and crossing site. All of this reduces renewal times considerably.

The advantages:

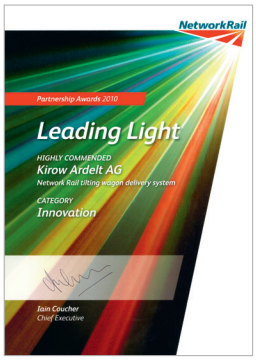
- gentle transport
- mechanised, streamlined installation process
- special load fixing and lifting beam system
- much shorter renewal times
- extremely accelerated site workflow
- significant savings

A specialised lifting beam lifts the switch section by means of the Cross Beams fixed onto the panel

Planning the modular site

→INFO

Certificate at the
"Network Rail Partnership Awards 2010"



Network Rail's success with the Switch Tilter system is significant: approx. 30 % cost savings and an approx. 50 % saving in renewal times while increasing working safety and the quality of the switches and crossings installed. The project study "Innotrack", for example, speaks of even greater savings potential and quality gains in "D5.4.2 – Final Report on the Logistics of S&C". Network Rail acknowledged Kirow's innovative achievement with an award at the "Network Rail Partnership Awards 2010".

↑
Technical Development Center

WHY KIROW?
CRANE CONSTRUCTION SINCE 1880.

→QKNOW-HOW

With more than 5,000 units delivered, Kirow is world market leader for railway cranes. Since the mid 90ies Kirow is also engaged in the field of industrial transporters for track construction, shipyards and steelmills and established itself as a specialist for heavy duty equipment. Kirow's products are based on organically grown know-how that has been built up gradually by working closely together with our customers. The very well proven product concept can be adapted to specific customer needs and individual railways' requirements. This way our customers get the best of both worlds:

- on the one hand they get the benefits that come from the proven reliability of standardised components and design principles
- on the other hand individual customer requirements can be fulfilled and tailor the Switch Tilter to comply with country specific regulations.

The types portrayed in the product overview section shall give you a first indication. Build examples can be visited upon request.

→QQUALITY

Quality means to us: a sophisticated product concept, profound know-how in the fields of constructional design and control as well as the highest degree of precision with regard to fabrication and execution. It goes without saying that our engineers test and check all mechanical, hydraulic and electrical groups of components meticulously.

All this provides decisive advantages:

- maximum capability and reliability
- low cost of operation
- long service life (even under the toughest operating conditions)

→QSERVICE

Our aim is to provide 'service excellence'. For us this means, among other things, to be present and available. Our customer service team is always ready to respond and support your operation helping prevent unnecessary downtimes; you can always contact us via the 24 hour hotline.

Highly-qualified engineers and technical service personnel in our after-sales service department provide additional support to ensure your safety and complete customer satisfaction. Last but not least, we place great importance on detailed and appropriate training and support of your personnel.

↑
Switch Tilter in the assembly hall

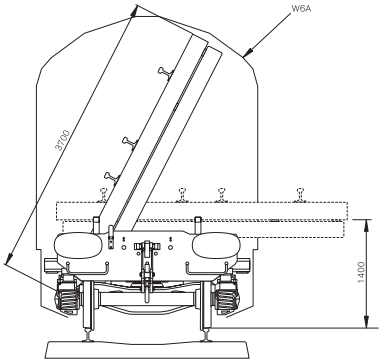
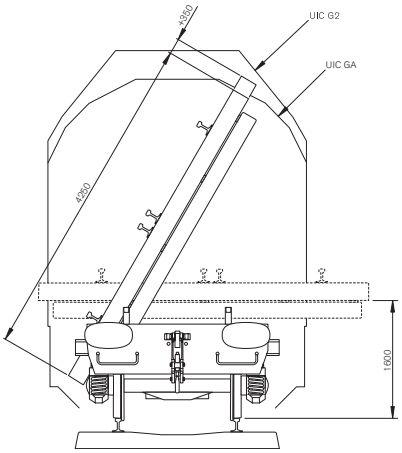
→QPARTNER APPROACH

The Switch Tilter is a product with an extremely long working life. The decision in favour of this transporter is simultaneously the beginning of a comprehensive customer/supplier relationship often becoming manifest in repeated orders and follow-up orders. We therefore attach great importance to ensuring that this relationship is fair and with long-term benefits for both sides. By the way, for us this starts long before the signing of the contract. We will be pleased to advise you, just give us a call.

↑
Kirow production facilities in Leipzig

THE SWITCH TILTER –
THE ESSENTIAL TECHNICAL KEY DATA.

AN OVERVIEW OF THE SWITCH TILTER.

	UK-W6A	TSI-UIC
		
DIMENSIONS		
→Q Wheel gauge	1 435 mm	1 435 mm
→Q Distance between pivots	19.0 m	19.3 m
→Q Length over buffers	24.7 m	25.24 m
→Q Length over buffers (Triple unit)	74.4 m	–
→Q Max. hauling speed	100 km/h	100 km/h
PAYLOAD		
→Q Maximum payload per bogie	max. 15.0 t	max. 18.0 t
→Q Load length	max. 22.5 m	max. 24.2 m
→Q Load length (within triple unit)	max. 26.5 m	–
→Q Load width	max. 3.7 m	max. 4.6 m
→Q Load width above bogies	max. 3.1 m	max. 3.5 m
→Q Height loading platform horizontally above top of rail	1.4 m	1.5 m
POWER PACK		
	Diesel hydraulic	Diesel hydraulic
LATERAL LOADING PLATFORM MOVEMENT		
	→Q Max. shifting distance 1 270 mm	→Q Max. shifting distance 1 250 mm
OPERATION		
	→Q Local control panel or wireless remote control	→Q Local control panel or wireless remote control
LOAD FIXING		
	→Q Hydraulically actuated load fixing and handling system	→Q Manual-mechanical load fixing system →Q Optional hydraulically actuated load fixing and handling system available

↑
Loaded Switch Tilter UIC

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