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Subsidiaries

Austria
Steyregg
Tel +43 732 641111-0
Fax +43 732 641111-33
office@stahlcranes.at

China
Shanghai
Tel +86 21 62572211
Fax +86 21 62541907
victor.low@stahlcranes.cn

France
Paris
Tel +33 1 39985060
Fax +33 1 34111818
info@stahlcranes.fr

Great Britain
Birmingham
Tel +44 121 7676414
Fax +44 121 7676490
info@stahlcranes.co.uk

India
Chennai
Tel +91 44 43523955
Fax +91 44 43523957
anand@stahlcranes.in

Italy
S. Colombano
Tel +39 0185 358391
Fax +39 0185 358219
info@stahlcranes.it

Netherlands
Haarlem
Tel +31 23 5125-220
Fax +31 23 5125-223
info@stahlcranes.nl

Portugal
Lisbon
Tel +351 21 44471-61
Fax +351 21 44471-69
ferrometal@ferrometal.pt

Singapore
Singapore
Tel +65 6271-2220
Fax +65 6377-1555
sales@stahlcranes.sg

Spain
Madrid
Tel +34 91 4840865
Fax +34 91 4905143
info@stahlcranes.es

Switzerland
Däniken
Tel +41 62 82513-80
Fax +41 62 82513-81
info@stahlcranes.ch

United Arab Emirates
Dubai
Tel +971 4 8053700
Fax +971 4 8053701
info@stahlcranes.ae

USA
Charleston, SC
Tel +1 843 767-1951
Fax +1 843 767-4366
sales@stahlcranes.us

F-RB-011-EN-03.08-vis visuell.de

➔ **www.stahlcranes.com**

STAHL CraneSystems GmbH, Daimlerstr. 6, 74653 Künzelsau, Germany
Tel +49 7940 128-0, Fax +49 7940 55665, marketing@stahlcranes.com

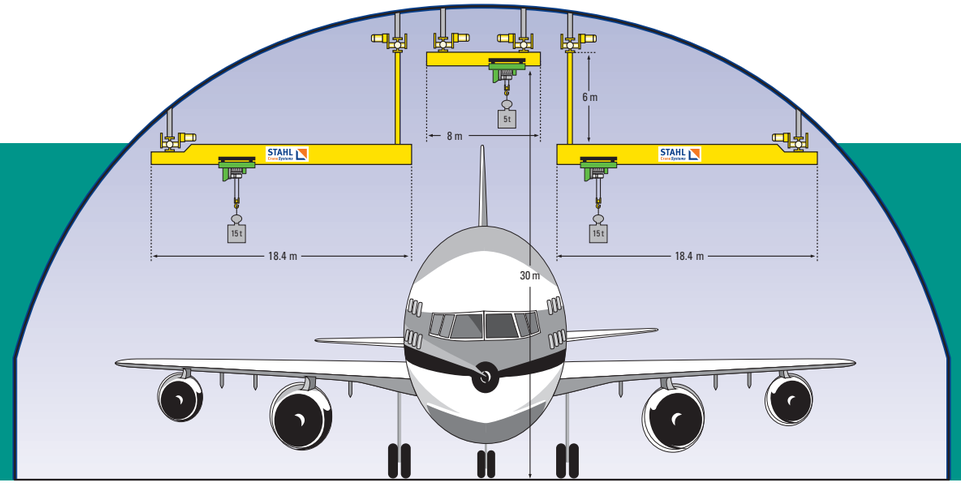
STAHL CraneSystems

Three suspension cranes with off-standard suspensions

Project partner Achelis Material Handling Ltd. _ **Scope of project** Supply and erection of three suspension cranes in a hangar _ **S.W.L.** 2 x 15,000 kg, 1 x 5,000 kg _ **Height of lift** 28.5 m _ **Spans** 2 x 18.4 m, 1 x 8.2 m _ **Equipment** Crane bridge suspended 6 m below runway on one side, designed for high crane runway tolerances of ±20 mm, guide system with horizontal guide rollers and universal joint suspensions, cast metal rope guides, insensitive to temperature, temperature control for motors

Lifting technology | Drive technology | Control technology

STAHL CraneSystems



The central crane is mounted directly below the ceiling and operated on a separate crane runway. This ensures clear access for the aircraft.

The six metre long suspensions permitted the 15 t cranes to be installed in the vaulted hangar.

Globalisation drives the economy world-wide and helps fast-developing African countries to increase their exports. East-African states in particular are producing more and more goods which find purchasers in Europe. Now as before, one's first thought is of coffee as their main agricultural product. However trade in the black beans is in fact diminishing. In its place business is booming with perishable goods: the Victoria Lake perch has made a triumphal entry into European kitchens in recent years and East Africa has in the meantime risen to be the world's largest flower exporter. Perishable goods often travel to their target markets by air. The states are expanding their infrastructure to cope with the rising volume of air traffic. This includes various building projects at international airports which record rising numbers of passengers and corresponding growth in airfreight.

Starting situation A leading African airline required a new hangar at its base airport in Kenya to be able better to carry out maintenance and inspection work on its growing aircraft fleet.

Requirements A special construction method was decided on which had already proven itself in a similar project in Australia. The building structure was particularly unusual: the arched roof structure was first pre-assembled on the ground and then spanned to its final arched form. As the crane systems are suspended from the arched beams the design engineers had to take into account significant horizontal play between the crane runway beams. In addition the arch offered an interesting challenge. Bridging the whole width of the hangar on one level was not a viable solution as in this case insufficient height would have been available in the centre of the building for aircraft to taxi in.

Realisation The specialists from our local project partner Achelis Material Handling Ltd. asked the Hannover branch of STAHL CraneSystems for advice. In collaboration with Achelis a crane concept was developed that met the technical requirements and yet was economically viable.
Three crane systems were planned to ensure that the aircraft could taxi freely through the hangar. The central crane is mounted directly underneath the ceiling and thus permits aircraft to enter without the tailplane colliding with the crane. As in the field of the central crane with 8 m span only fairly light loads have to be lifted, an S.W.L. of 5,000 kg was calculated. To the left and right of the aircraft body however the heavy turbines must be transported, thus an S.W.L. of 15,000 kg was decided on for both sides. A span of 18.4 m for both cranes permits the loads to be transported horizontally without hindrance. As the two outside cranes are mounted on the pitched roof structure the crane bridges had to be supended 6 m below the runways on one side. To cope with the high tolerances in the crane runways the heavy duty cranes are equipped with guide rollers on the lowered sides.
On the opposing sides of the cranes the endcarriages are connected to the crane bridges with universal joints. This ensures that the horizontal and vertical forces are introduced safely and defined in spite of the great crane runway tolerance.
STAHL CraneSystems equipped the cranes with original SH series wire rope hoists. Heights of lift of up to 30 m must be mastered in the hangar. For these heights, the drive technology of the wire rope hoists is designed with reserves of power: the hoist motors dispose of 60% DC (duty cycle). The long-life rope guides in cast metal are not temperature-sensitive and ensure that the rope lies safely and taut on the drum.
Radio remote controls were installed for safe operation of the cranes so that the crane operator can transmit the travel commands to the crane by means of a portable transmitter without any hindering cables. STAHL CraneSystems also equipped the crane systems with power supply systems along the 76 m long crane runways. To avoid corrosion damage on the long sea journey to Africa the cranes were painted with a high-quality topcoat.

Result From conception to supply to erection and commissioning, the project was carried through by STAHL CraneSystems together with Achelis Material Handling Ltd., from order placement in April 2005 to production. In March 2006 the cranes, in suitable export packaging, started their journey by sea to Africa where they were erected and commissioned by STAHL CraneSystems. In the meantime the hangar has been commissioned – equipped with three cost-effective suspension cranes produced to an uncommon concept.