

SBIA Bangkok International Airport, Thailand

23,000 t of Main Terminal Building Roof Erection
by VSL Heavy Lifting



▲ *Lifting Super Truss, with previously erected Super Trusses in the back ground*

Bangkok's new international airport is currently under construction 25 km to the south east of the capital. This landmark project has provided a unique stage for VSL to display the benefits of its Heavy Lifting technology in saving time and money.

A spectacular feature of the new airport is the Main Terminal Building and its graceful roof. The impressive structure is 580 m long, 210 m wide and 50 m high. Its spacious interior will house standard facilities like check-in's, immigration and baggage handling and even parks and gardens for the enjoyment of the travellers. It is linked to the Concourse Buildings, car parks and other facilities.

The roof structure and its supports consist of about 38,000 t of steel, to be fabricated and erected in only 16 months. VSL has been influential in providing engineering assistance for the erection schemes, from design conception on, in order to maximise quality and productivity of the steelwork fabrication for this complex project.

In late 2002 VSL was awarded the contract for the supply and operation of custom designed heavy lifting installations for the erection and placement of over 23,000 t of the roof structure.

The Main Terminal Building roof consists of 16 four legged steel pylons of 30 m height. These support 8 gigantic Super Trusses of 210 m length and 1,600 t weight. Each of the 7 bays formed by 2 Super Trusses will support 19 Secondary Trusses of 81 m length. 2 Wing Girders will form the ends of each bay. These girders provide the horizontal stability of the roof and also form an important aesthetic part.

For placing the massive Super Trusses on the pylons, VSL has designed a „lift and slide“ scheme. The trusses are fabricated in sections in numerous workshops in Thailand and transported to site. They are assembled in alternate bays 13.5 m offset from their final position.

This arrangement frees up every second bay for other construction activities. Each Super Truss is then lifted vertically through 30 m, launched laterally by 13.5 m and finally lowered onto the pylon structures.

▼ *Super Truss during slide*



A particular challenge for the fabricator / erector was the ambitious schedule. The original schedule required one Super Truss to be placed every month, in fact the scheme successfully enabled up to 3 Super Trusses to be placed in one month.



▲ *Completed frame of supertruss and pylons*

For lifting and lateral launching, VSL used 2 temporary support beams that were lifted and lowered by means of VSL Strand Lifting Units (SLU's) with 550 mm jack stroke. Each support beam was equipped with 2 SLU's that were installed on temporary lattice towers and 4 inverted SLU's in the axis of the four-legged pylons. Lateral movement of the Super Trusses was achieved by means of smaller horizontally mounted SLU's. Lifting operations were controlled from a remote centre featuring fully integrated displacement and load control systems.

▼ *Inverted Strand Lifting Units attached to the support beam, climbing up the static lifting cable*



During the whole operation the Super Truss rested on sledges. These were equipped with hydraulics to allow movement and rotation in all directions. The advanced features of the lifting installation allowed for positive load distribution control and a final adjustment of the Super Trusses within millimetres.

The Wing Girders are assembled in situ on 36 m high temporary platforms. Once erection work in a bay is done, the platforms are skidded out, transferred and skidded in for the next bay.

The erection of the Secondary Trusses uses an incremental sliding and placing sequence followed by the synchronized stressing of their stabilising link bars. The Secondary Trusses are assembled complete with their skylights on temporary platforms at their final height using cranes. The Secondary Trusses are then progressively slid in towards the centre from each end allowing the next row of Secondary Trusses with their roof elements to be assembled and advanced in a similar and repetitive manner. In this way work aloft can be more easily controlled in two distinct assembly / production areas. These table platforms as well are then skidded out, transferred and skidded in for assembly work in the next bay.

The project is being executed by VSL (Thailand) Co. Ltd, in cooperation with VSL (Switzerland) Ltd. and VSL Singapore Pte. Ltd for equipment supply and assistance on site, and the VSL Technical Centres for engineering assistance.

OWNER : NBIA

New Bangkok International Airport Co., Ltd

Designer: MJTA

Murphy/Jahn Inc-TAMS-ACT Consortium

Construction Administration: PMC

Pacific Consultants International-Epsilon-Roge and Associated-Asian Engineering Consultants Corp.

MAIN CONTRACTOR : ITO-JV

Italian Thai Development - Takenaka Corporation - Obayashi Corporation - JV

Principal Steelwork Subcontractor :

Yongnam Engineering & Construction

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