



STEEL BUILDING SYSTEMS

OVERVIEW: SUPALOC®

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1 Overview of SBS

1.1 Overview of SBS

Steel Building Systems (SBS) has over 20 years experience in manufacturing products for the Australian residential and commercial construction industry. Prior to 1996, SBS operated as a construction company building residential homes. After conducting extensive research and development of alternative home structures, SBS developed a steel framing system that offers:

- enhanced building safety
- efficient construction
- precise measurement added building strength and stability.



Figure 1: Supaloc Headquarters at Elizabeth, South Australia

SBS has continued to invest heavily in this technology and now offers a world class product to residential, commercial and industrial building companies across Australia and the world.

SBS's strong, engineered and durable product is renowned among builders as a trusted system for the construction of lightweight steel framed homes. It is considered the market leading product in Australia and is continuing to gain international recognition expanding into Malaysia, Europe, Asia and the United States of America.

1.2 The Supaloc® system



Figure 2: House frame using the Supaloc Steel Building System

SBS's product is known as the Supaloc® steel building system - a series of unique lightweight steel building products used in the construction of steel framed homes.

The Supaloc® system provides builders with preassembled house frames, packed for transportation and efficient assembly at

construction sites. The unique patented frame connections simply bolt or clip together reducing site construction time significantly and guaranteeing structural integrity.

The Supaloc® system is manufactured using innovative and patented computer aided design (CAD) driven machinery. The CAD software system has been customized for the Supaloc® product and allows for the three dimensional design of structures. Designs are uploaded into the Supaloc® machinery and automatically actioned for manufacture. The direct link between the CAD system and the manufacturing machinery guarantees pinpoint accuracy, efficient production and minimizes human error.

2 The Supaloc® Product

2.1 Chronology of Supaloc® technology

The outline below sets out the key milestones in evolution of the Supaloc® technology:

- **1996:**
 - SBS was established in May operating out of a factory located in Welland.
 - Entered into a supply agreement with BlueScope.
- **1995-2003:**
 - Steel framing products underwent vigorous testing at the BlueScope testing facility at Port Kembla New South Wales.
 - Steel framing products became certified by Ginos & Associates Engineers.
- **1997:**
 - Development of the Supaloc® system. First product produced on SBS's first generation of company developed machines.
 - International patents granted in three jurisdictions.
- **2002:**
 - operations moved to current facility at Elizabeth South Australia
- **2003:**
 - Opened second production facility in NSW.

2.2 Product development

SBS is focused on designing the world's best steel frames for building construction and has



invested heavily in its manufacturing facilities and information technology to create and improve its products.

SBS uses customised CAD software for the ongoing development of its products and machinery. The design

of SBS's machinery and associated tooling has progressed over the years and is now capable of producing a world leading high precision product.

SBS operates a full time research and development team, which constantly investigates more efficient and innovative methods of construction and manufacturing. SBS also employs a full time systems engineer who is responsible for maintaining and improving the Supaloc® CAD system.

2.3 Supaloc® products

The Supaloc® system includes a range of lightweight steel building products custom designed to maximise strength and durability in the construction of:

- residential single and multi-storey constructions
- commercial shopping developments, offices and resorts
- portable kit form buildings.

The Supaloc® system is efficient and cost effective; its key competitive advantage over other building systems.

Key features of the products include:

- products are packed in flat packs ready for installation
- products have detailed connection instructions including descriptive labeling
- all products are compatible with any style of wall, ceiling or roofing material
- products are made from lightweight Zinalume steel making them noncombustible, termite free and corrosion resistant
- each product has undergone vigorous testing at the BlueScope testing facility at Port Kembla by the University of Adelaide and the University of Sydney.



Figure 3: Supafloor platform being erected

All structures produced using the Supaloc® system are certified by independent structural engineers to Australian building code standards.

A summary of the Supaloc® products are provided below.

2.3.1 Wall frames

Supaloc® steel wall frames consist of a top and bottom horizontal tracks and vertical 'c' members known as studs. Supaloc® wall frames will not change dimension due to weather conditions. The frames feature pre cut electrical and plumbing outlets, are easily modified and may be fabricated into complex shapes.



Figure 4: Walls being erected

2.3.2 Roof Trusses and ceiling battens

Roof trusses support roofing materials and can span up to 20 metres without additional wall support. Ceiling battens provide the bracing under roof trusses.

Supaloc® roof trusses are provided in many different styles and utilise a patented tie down system that firmly fixes the trusses to the structure, providing superior performance in high wind areas.

2.3.3 Open web joists

Open web joists are a steel network structure that provides support between floors in multi-story buildings. These provide exceptional strength to the Supaloc® flooring system. The added strength provided by the steel allows for large spans of open plan living.

2.3.4 Roof purlins

Roof purlins are a sheet of metal attached to the peak of the roof section of structures. They act as a 'top hat' and are used to support roof sheeting and tiles and to brace roof trusses.

2.3.5 Supafloor

Supafloor is used in transportable and multi-story housing. The product is prepared as panels or in kit form and provides a frame to lay floor sheeting.

2.3.6 Porto cabins and kit homes

Supaloc® also provides corrosion resistant portable cabins and kit homes capable of withstanding 41 metres per second wind speeds.



Figure 5: Supafloor over column support

2.4 Manufacturing process

SBS manufactures the majority of its Supaloc® product from its 51,000m² property in Elizabeth South in the heart of Adelaide's industrial region. A further factory is located in Tomago, NSW. The Supaloc® manufacturing process primarily involves roll forming of steel wall frames, roof trusses and floor joists.



Figure 6: Wall top plate manufacture

2.4.1 Machines

The following roll forming machines, developed by SBS, are used in the manufacturing process:



Figure 7: view of chord machine

- chord machine which produces the chord section of trusses/joists
- web machine which is used to create the web sections of the trusses/ joists
- plate machine which creates plates that form horizontal components included in the top, bottom and centre components of the walls
- stud machine which creates the vertical studs that are the vertical component of the wall structure
- floor machine which produces the flooring section used in the Supafloor system.

These machines are designed to operate with minimal operator interference and promote easy and efficient maintenance, thereby reducing labour costs.

2.4.2 Design

All Supaloc® machinery is driven using customised CAD software which allows draftsmen to draw projects in a three dimensional environment. The software is customised to Supaloc®'s system, which provides speed and accuracy when designing frame formats.

2.4.3 Production

Machines commence production when files are transferred from the CAD software. The file establishes the layout of the frames including window and door locations, head height and connection points.



Figure 8: aerial of roll forming area

All of the machines have different output times, allowing jobs to be run in any order. The machines are fitted with an industrial inkjet printer, which uniquely labels each part that is produced thereby facilitating ease of assembly. Only one person is required to operate each machine.

The Supaloc® system provides a degree of accuracy that was previously unheard of in housing construction. The use of CAD means that production is accurate to approximately +/-0.5mm.

2.4.4 Handling

Once profiles have been manufactured, they are taken to the assembly yard where a team put the components together using computer coded profiles and flat pack the structures for transportation to the building site where they are erected into wall, truss and joist panels. The assembly of the steel frames requires minimal skill and is therefore able to be performed by unskilled workers, with minimal on-the-job training.

2.4.5 On site

On site, it only takes a few days to erect a typical 180m² home with 3 people. Making the Supaloc® system one of the most labour effective systems available.