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#### RESOURCES FOR INSPIRATION AND CREATIVE THOUGHT

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<http://www.brunejair.com>  
<http://www.core77.com>  
<http://www.designboom.com>  
<http://www.design-engine.com>  
<http://www.designsponge.blogspot.com>  
<http://www.dexigner.com>  
<http://www.egganddart.com> , A319 Business Jet  
<http://www.egganddart.com> , A319 Business Jet  
<http://www.framemag.com>  
<http://www.ids-hamburg.de>, Boeing BBJ VIP  
<http://www.mocoloco.com>  
<http://www.placesandspaces.com>  
<http://www.stylepark.com>  
<http://www.swiss.com>  
<http://www.treehugger.com>



Figure 41: mountains and an aerial transport system (Louw:2005)

## APPENDICES 1: TERMINOLOGY AND DEFINITIONS

## TERMINOLOGY AND DEFINITIONS

The field of aerial ropeways is highly specialized and, as such, has its own terminology and definitions, which may be considered unusual. In order to simplify matters, this section is added to provide a basic list of terms used in aerial ropeway technology and design. In some cases, common alternatives are also included.



### AERIAL LIFT:

An aerial lift is a means of transport in which funitels, gondolas or open chairs are hauled above the ground by means of a cable. Types of aerial lifts include: Aerial tramway, funitel, gondola lift, funifor and detachable lift (<http://www.skilifts.org>).



### AERIAL TRAMWAY:

An aerial tramway is a type of aerial lift, often called a cable car or ropeway, and sometimes incorrectly referred to as a gondola. Because of the proliferation of such systems in the Alpine regions of Europe, the French and German language names of Téléphérique and Seilbahn are often also used in an English language context. "Cable car" is the normal term in British English, as in British English the word "tramway" generally refers to a railed street tramway (<http://www.skilifts.org>).



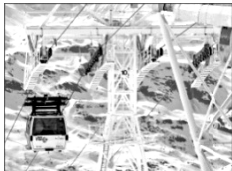
### ANGLE STATION:

A structure at which the lateral direction of the path of the ropeway changes (<http://www.skilifts.org>).



### CABLE CAR

cable car is any of a variety of transportation systems relying on cables to pull vehicles along or lower them at a steady rate, or a vehicle on these systems (<http://www.skilifts.org>).



### CARRIAGE:

(Or cabin; car; funitel; gondola; chair; carrier)  
The carriage is the vehicle, which carries the passengers (<http://www.skilifts.org>).



DETACHABLE  
CHAIRLIFT:

A detachable chairlift or high-speed chairlift is a type of passenger aerial lift, which, like a fixed-grip chairlift, consists of numerous chairs attached to a constantly moving wire rope (called a *haul rope*) that is strung between two (or more) terminals over intermediate towers. They are now commonplace at all but the smallest of ski resorts. Some are installed at tourist attractions as well as for urban transportation.

The significance of *detachable* chairlift technology is primarily the speed and capacity. Detachable chairlifts move far faster than their fixed-grip brethren, averaging 6 m/s versus a typical fix-grip speed 2.5 m/s. Because the cable moves faster than most passengers could safely disembark and load, each chair is connected to the cable by a powerful spring-loaded cable grip, which detaches at terminals and slows considerably for convenient loading and unloading, typically 1 m/s (<http://www.skilifts.org>).



FUNITEL:

A Funifor is a type of aerial lift or aerial tramway with two guide ropes and a haul rope loop per cabin. The Funifor design is patented by Doppelmayr Garaventa Group. Two reversible cabins run on parallel tracks. The drives of the two cabins are not interconnected. At the top of each track, the haul rope for that track loops back to the bottom instead of looping over to serve the other track as occurs with a normal aerial tramway. This feature allows for single cabin operation when traffic warrants. The independent drive also allows for evacuations to occur by means of a bridge connected between the two adjacent cabins. The main advantage of the Funifor system is its stability in high wind conditions owing to the horizontal distance between the two guide ropes comprising each track. The Table Mountain Cableway is an example of such a system (<http://www.skilifts.org>).



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GONDOLA:

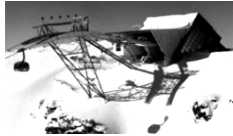
A gondola lift is a type of aerial lift, often called a cable car, which consists of a loop of steel cable that is strung between two stations, sometimes over intermediate supporting towers. The cable is driven by a bullwheel in the terminal, which is connected to an engine or electric motor. Gondolas ropeways offer a highly comfortable ride and this system can be used in ski areas, tourism resorts and the urban environment. The enclosed carriers provide full protection against the elements, and are designed with a strong focus on families and the elderly. Carriers travel through the terminals at creep speed and accelerate to a speed of up to 6m/s. Carrier capacity varies from four to 15 persons, and system capacity can reach 3600 persons per hour (<http://www.skilifts.org>).





**DRIVE**

The "brains" of the lift. The drive is the electronic circuitry which controls the amount of voltage sent to the primary motor of the lift and controls its speed. Modern lifts are powered by Direct Current, controlled by the drive, which allow them to operate very smoothly and efficiently. The drive is also tied in with all of the lift's inline safety circuitry, which shuts down the lift automatically in the event of a problem on the line or in one of the terminals (<http://www.skilifts.org>).



**DRIVE TERMINAL**

The terminal which houses the motor, gearbox, auxiliary engine and drive and safety circuitry. It can be at either the top or the bottom of the lift ("top drive," "bottom drive.") A top drive lift is slightly more energy efficient than a bottom drive lift, but requires the ski area to run electric service to the summit, which can be very costly (<http://www.skilifts.org>).



**MAZE**

The area in which skiers and snowboarders gather while waiting to board a lift. Mazes are designed to optimise chairlift loading. Skiers and riders often call mazes "lift lines" (<http://www.skilifts.org>).



**GRIP: (or clamp)**

The grip is the device, which attaches the hanger to the rope (<http://www.skilifts.org>).



**HANGER:**

The hanger is the load bearing structure from the rope to the carriage (<http://www.skilifts.org>).



**LINE:**

The axis of the rope viewed in plan (<http://www.skilifts.org>).

**MONO-CABLE:**

A mono-cable ropeway is one where the carriage is attached directly to a single rope. This rope performs both the carrying and the hauling functions (<http://www.skilifts.org>).



**MULTI-CABLE:**

Except for the double mono-cable ropeway, multi-cable ropeways are those that allow the carriage to run on wheels on a stationary rope(s) called the track rope. The motive effort is supplied by hauling or moving rope(s) which is attached to the bogie of the supporting wheels. In case of double mono-cable ropeway, the carriage is attached directly to two carrying-hauling ropes (<http://www.skilifts.org>).



**ROPE:**

Rope in aerial ropeway always refers to wire rope consisting of several strands of steel wires and/or spiral ropes. The rope may have a fibre core strand in some cases. The configuration of the wires (or strand) in the rope depends on its duty (<http://www.skilifts.org>).



**TERMINALS:**

Buildings at the ends of a line (stations may be situated at intermediate points in the line). Passengers may embark, transfer or alight only at terminals or stations (<http://www.skilifts.org>).



**TRESTLE/TOWER**

A trestle is a structure of steel or concrete spaced along the line of an aerial ropeway in order to either support or depress the rope to maintain the correct profile and tension characteristics (<http://www.skilifts.org>).

**CABLE CAR RELATED TERMS:**

**ROOF**

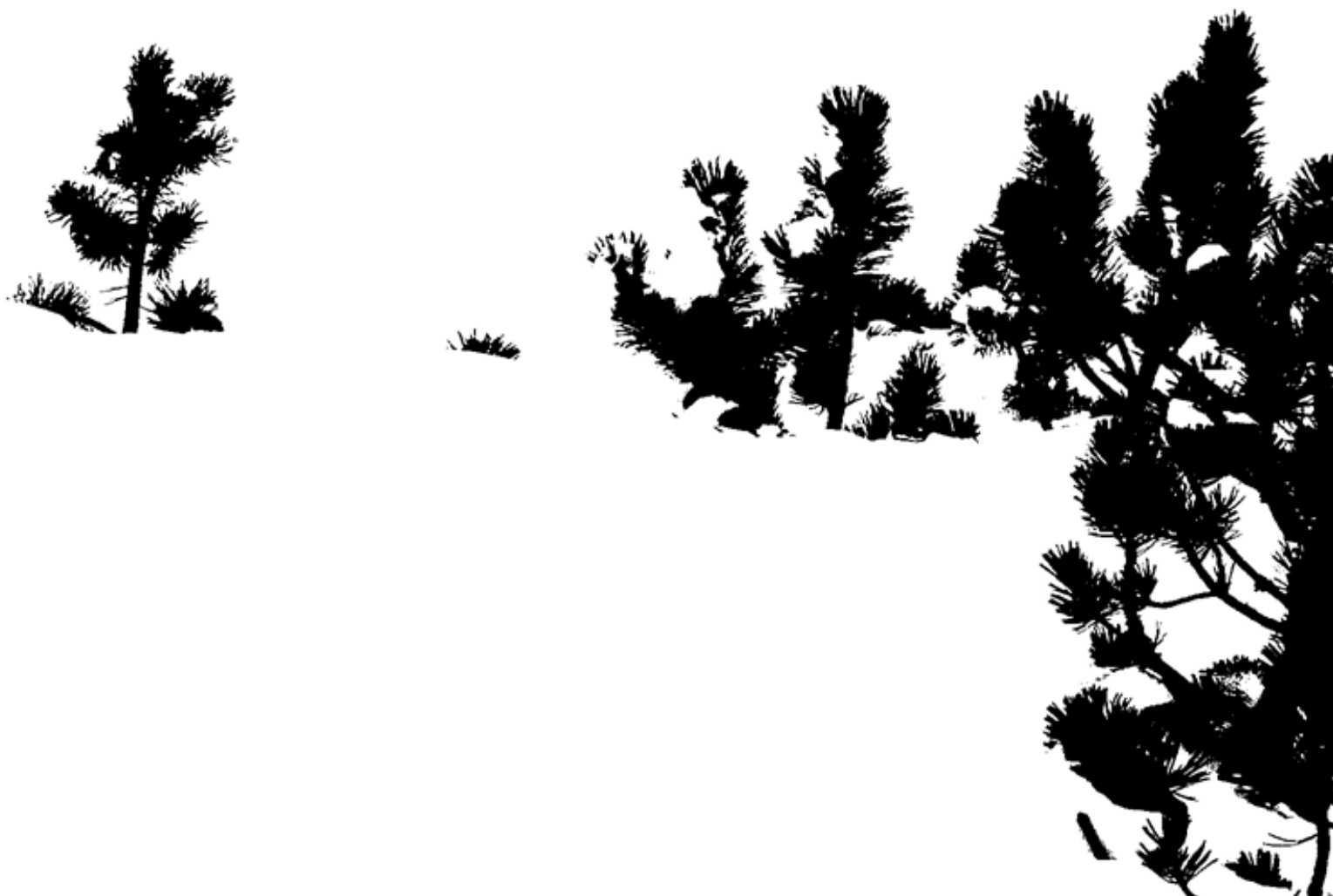
Upper covering of a building, car, cavity or space

**CEILING**

An overhead interior surface that bound the upper limit of a space. Generally not a structural element, but a finished surface concealing the underside of the roof structure above

**FLOOR**

The lower horizontal surface of a space and/or the supporting structure underneath it



## APPENDICES2: MANUFACTURING

## MANUFACTURING

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### RESIN TRANSFER MOULDING (RTM)

>

#### Description

Fabrics are laid up as a dry stack of materials. These fabrics are sometimes pre-pressed to the mould shape, and held together by a binder. These 'performs' are then more easily laid into the mould tool. A second mould tool is then clamped over the first, and resin is injected into the cavity.

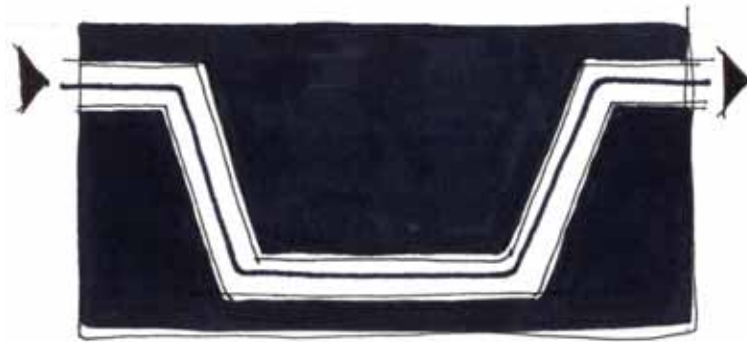


Figure 42: Resin Transfer Moulding (Composite Materials information sheet 2007)

>

#### Main Advantages:

- High fibre volume laminates can be obtained with very low void contents (Moore, 2007).
- Good health and safety, and environmental control due to enclosure of resin (Moore, 2007).
- Possible labour reductions (Moore, 2007).
- Both sides of the component have a moulded surface (Moore, 2007).

>>

WET LAY-UP/HAND LAY-UP

>

#### Description

Resins are impregnated by hand into fibres which are in the form of woven, knitted, stitched or bonded fabrics. This is usually accomplished by rollers or brushes, with an increasing use of nip-roller type impregnators for forcing resin into the fabrics by means of rotating rollers and a bath of resin. Laminates are left to cure under standard atmospheric conditions.



Figure 43 Wet-Lay-Up/Hand Lay-Up (Composite Materials information sheet 2007)

>

#### Main Advantages:

- Widely used for many years (Moore, 2007).
- Simple principles to teach (Moore, 2007).
- Low cost tooling, if room-temperature cure resins are used (Moore, 2007).
- Wide choice of suppliers and material types (Moore, 2007).
- Higher fibre contents, and longer fibres than with spray lay-up (Moore, 2007).

>>

## VACUUM BAGGING

>

### Description

This is basically an extension of the wet lay-up process described above where pressure is applied to the laminate once laid-up in order to improve its consolidation. This is achieved by sealing a plastic film over the wet laid-up laminate and onto the tool. The air under the bag is extracted by a vacuum pump and thus up to one atmosphere of pressure can be applied to the laminate to consolidate it.

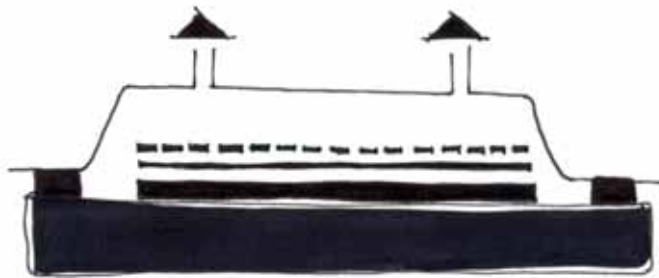


Figure 44: Vacuum Bagging (Composite Materials information sheet 2007)

>

### Main Advantages:

- Higher fibre content laminates can usually be achieved than with standard wet lay-up techniques (Moore, 2007).
- Lower void contents are achieved than with wet lay-up (Moore, 2007).
- Better fibre wet-out due to pressure and resin flow throughout structural fibres, with excess into bagging materials (Moore, 2007).
- Health and safety: The vacuum bag reduces the amount of volatiles emitted during cure (Moore, 2007)

>>  
RESIN FILM INFUSION (RFI)  
>

**Description**

Dry fabrics are laid up interleaved with layers of semi-solid resin film supplied on a release paper. The lay-up is vacuum bagged to remove air through the dry fabrics, and then heated to allow the resin to first melt and flow into the air-free fabrics, and then after a certain time, to cure.



Figure 45: Resin Film Infusion (Composite Materials information sheet 2007)

>  
**Main Advantages:**

- High fibre volumes can be accurately achieved with low void contents (Moore, 2007).
- Good health and safety and a clean lay-up, like prepreg (Moore, 2007).
- High resin mechanical properties due to solid state of initial polymer material and elevated temperature cure (Moore, 2007).
- Potentially lower cost than prepreg, with most of the advantages (Moore, 2007).
- Less likelihood of dry areas than SCRIMP process due to resin travelling through fabric thickness only (Moore, 2007).