EPSE AWARDS 2016

BEST POLYCARBONATE PROJECTS COMPETITION

WINNING PROJECTS & NOMINEES

ABOUT THE BEST POLYCARBONATE PROJECTS COMPETITION

COMPETITION

EPSE Awards is an internal competition and the Awards 2016 is the 8th edition.The aim of this event is to promote **unique properties of polycarbonate** and a wide array of applications in which it may be used.

Polycarbonate is a material which can be easily worked and modelled, and therefore, it can be used virtually for any kind of application.
It is widely used in the construction sector, mainly for big-size installations like stadiums, arenas or olympic venues.

PC sheets are commonly used in engineering and among others in the automotive, electronics and medical industries. More recently polycarbonate caught the attention of interior architects & furniture designers, artists and number of other niche markets.

ABOUT EPSE

European Polycarbonate Sheet Extruders (EPSE) promotes the use of polycarbonate sheets in the European market and develops industry standards. The group manufactures over 120 000 tonnes of polycarbonate sheets every year and generates a turnover of over 500 million €. The EPSE members are present all over the EU28.

EPSE was founded in 2003, by 5 prominent polycarbonate manufacturers, as a Sector Group of European Plastics Converters.Today EPSE is comprised of 11 leading producers of polycarbonate multiwall, corrugated, and solid sheets* who are supported by 3 resin producers**.

JUDGING PROCESS

There are 2 phases in the judging process.
In the first step the jury panel judges the projects individually.

The 3 best graded projects go on to the second step which is a public voting.

The pre-selected projects are published on the EPSE website where the public votes on their favourite project in each of the 3 categories.


SUSTAINABILITY


INNOVATION


DESIGN

NOMINEES 2016

The following brochure presents all the projects submitted to the 2016 edition of the Awards and highlights the winners and runners up.
All the nominees 2016 are a perfect example of the intrinsic properties of PC sheets. They clearly demonstrate high impact- & fire-resistance, durability, flexibility, lightweight and transparency of polycarbonate.

*** EPSE MEMBERS**

sheet producers

arla · BRETT MARTIN · covestro · Danpalon Light Architecture · dott.gallina POLYCARBONATE SHEETS AND SYSTEMS · DS Smith · Koscon Industrial S.A. SHEETS AND SYSTEMS IN POLYCARBONATE · PALRAM · PLAZIT POLYGAL The Plastic Sheets Group · POLYCASA Your home for plastic sheet · sabic

**** resin suppliers**

covestro · sabic · TRINSEO

JURY PANEL 2016

FRÉDÉRIC MIDY

CEO - ALIAXIS (EMEA)/ CHAIRMAN - EUPC B&C DIVISION | JURY PRESIDENT

Frédéric Midy has 15 years of experience as "full" CEO, COO, Managing Director (EMEA, France, Benelux, Spain, Scandinavia, Eastern Europe) within big international and industrial groups as well as mid sized structures and within matrix and multicultural organizations.

Leadership, Strategic Vision, Deployment and Execution are acknowledged skills demonstrated both during growth and crisis periods. Evolution within various shareholders structures: LBOs, big groups and family-owned companies. Dynamic, Competitor, Decision Maker and Leader.

ALEX CHINNECK

ARTIST & DESIGNER

Uniting the disciplines of art, architecture, engineering, construction and place-making, the work of British artist Alex Chinneck is considerable in ambition and often in scale, producing contextually responsive sculptural interventions that compliment and elevate the place in which they stand.

At 30 years of age, Alex Chinneck is a graduate of Chelsea College of Art, a Board Member of the Royal British Society of Sculptors and an experienced international lecturer. His work has been featured extensively by international media with selected projects welcoming over one Million visitors.

ULRIKE MAU

EDITOR-IN-CHIEF OF PIE– PLASTICS INFORMATION EUROPE

Before joining PIE (published by KI Group, Bad Homburg, Germany) in 1994, Ulrike studied economics and French at the Universities of Frankfurt am Main in Germany and Lausanne in Switzerland. Soon after she gained experience in the Public Relations Department of a leading chemical group and journalistic field.

Ulrike has profound knowledge of the plastics industry and respective media and is a jury member of the German pro-K plastics consumer products awards. She is also a shareholder of KI.

PAUL VAN DEN BERG

ARCHITECT, FOUNDER OF ATELIER ARI

Paul studied architecture at the HTS Rotterdam, TU Delft and UCD Dublin. His work experience includes TU Delft, BAR Architects, ZUS [Zones Urbaines Sensibles] and the startup of Paul Scales. Paul was involved in the design of public buildings, urban projects and the development of Het Schieblock Rotterdam.

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SUSTAINABILITY

"Sustainability is the key to our survival on this planet and will also determine success on all levels"

Shari Arison

IL CENTRO ARESE SHOPPING CENTRE

ARESE /MILAN, ITALY

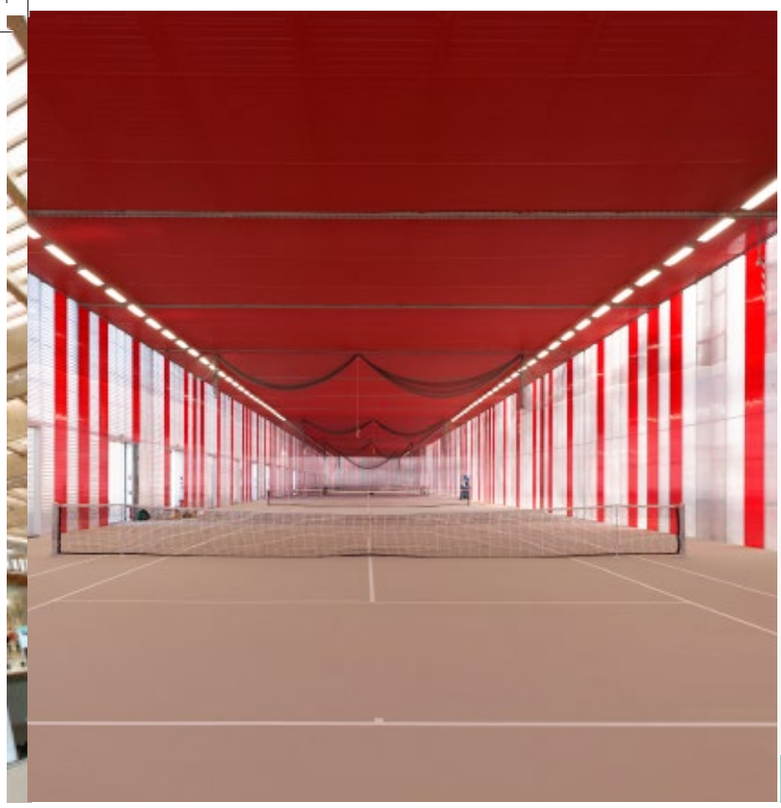
DESIGNER: MICHELE DE LUCCHI

DOTT.GALLINA

From 1963 to 2002 the Arese district was home to the headquarters of Alfa Romeo - the famous Italian carmaker brand. Manufactured here were legendary cars like Giulia, Alfetta, the Alfa6, Giulietta or Alfa Spider to name just a few. In 2013 the industrial building-refurbishment transformed the old sheds into a shopping mall –one of the largest in Europe. Its aim was to give new business dynamic to the area by exploiting the location's advantage. Aaddtionally, was also the willingness to keep the 'car spirit' of the area. As a result Historical Museum and Showroom of Alfa Romeo was created. Moreover, the old racetrack has been modernized, in the place where before Alfa Romeo car-tests took place, now there is a 1.500 meters long free race-circuit which is sponsored by ACI-Safery Drive Center. The main idea behind this project is to propagate responsible driving and to promote motor show exhibitions.

The structure of the Shopping Center is designed by a worldwide renowned architect Michele de Lucchi, who was inspired by the geometric features of the traditional architecture in Northern Italy, namely: "Corti Lombarde" (ancient courts of Lombardy) which can be found in the ancient rural residencies like villa Valera. Pergolas, arcades and squares are some of the elements that characterize this type of architecture. In the shopping-center itself, emblems of this style can be found in the exterior façade of the entrance and the inner large hexagonal square. Right from this point onwards the **translucent gallery** begins: in total surface of 120.000m2. The shopping mall has two levels and accommodates around 205 shops, 25 restaurants, several play areas, a sports center and a medical surgery. This striking building is characterized by an imposing translucent roofing that makes the immense hall look much lighter. It enhances the visibility of wooden beams and allows natural light to penetrate the inside of the building. These elements offer visitors an experience of walking through the streets of a typical ancient Italian town center. 17.000m2 of modular **PC multiwall panels in opal colour** were installed to allow daylight in the interior of the mall. Polycarbonate has facilitated the diffusion of the light reducing at the same time the radiation which is normally caused by a transparent surface. Furthermore the particular IR-surface treatment on the panels' external wall allowed to block the passage of infrared rays that would cause a temperature rise inside of the building.

Additionally, 7 sheet walls with a higher quantity of internal air chambers allows reducing thermal transmission during the winter period.
The combination of these elements has ensured a good performance in terms of thermal transmittance [U], which reduces the air conditioning and lighting costs. Further technical peculiarity of the project comes from the Dott.Gallina production capacity which allows for single co-extrusion. Thanks to this it was possible to produce **31m long PC panels** which do not have continuity joints and as a result they help to minimalize infiltration risk. The easy handling of these bulky panels was possible thanks to the light weight of multiwall polycarbonate.
The entire project was developed following strict criteria regarding energy saving and bio-sustainability. In fact the external columns made in green marble of Italian Alps, the presence of several shady green areas, the use of precious Glulam wood (whose chromaticism is transformed over time) are the visible elements of a functional Green-oriented strategy. The goal is to create a structure where the technological advantages would be combined with natural elements. In this context, the **polycarbonate** helped to maximize two essential resources such as light and heat.



JULES LADOUMÈGUE SPORT COMPLEX

PARIS, FRANCE

ARCHITECT: DIETMAR FEICHTINGER

DAN PAL

This sport complex building is 260m long and hosts 6 tennis courts as well as dedicated spaces for: rugby, football, basketball, squash, dancing, climbing and many more.

It was built above maintenance workshops.
As the complex is located just outside the ring road surrounding Paris its mass and size are used to protect the neighborhood from the noises of the heavy traffic.
The west façade is therefore exposed to two very aggressive factors that are rarely compatible with the usage of light façades these are: external loud sounds and high exposure to the sun rays.

Dietmar FEICHTINGER found the solution by designing a **double skin made of polycarbonate sheet system** on the outside and 30mm polycarbonate panels on the inside. This resulted in a very energy efficient building with an outstanding level of comfort for the users during the day.
The polycarbonate system used in this building features rotating blades that act as 'brise-soleil'. Depending on the level of sunlight, the electronics of the system adjusts the orientation of the blades and keep the amount of solar gains to its best level.
Both inner walls are made with 30mm polycarbonate sheets, providing thermal insulation, sound absorption and tennis balls impact resistance. The western wall is double glazed with polycarboante. The eastern one is externally covered by static wood louvers.

The west façade, which covers 2500m² and is 9.5m high, features 260 units of motorized **polycarbonate panels acting as sound and solar heat barriers**, on top of their attractive architectural l. The inside skin of the façade, the 30mm polycarbonate panels, reinforces the Ug value of the façade allowing this double system to reach a performance of 0.75 W/m².K. P**olycarbonate panels used in this project feature a very strong UV protection insuring the durability throughout the years**. They have undergone series of durability tests to assess their aging process and their resistance to impacts.

The Tennis Courts are part of the Jules Ladoumègue Sport complex that was awarded a Bronze medal in 2015 by the International Olympic Committee.

The Jules Ladoumègue Sport complex was designed by Dietmar FEICHTINGER, Austrian architect established in Vienna and Paris who is well known for his audacious projects including the new road-bridge to the Mont Saint-Michel.

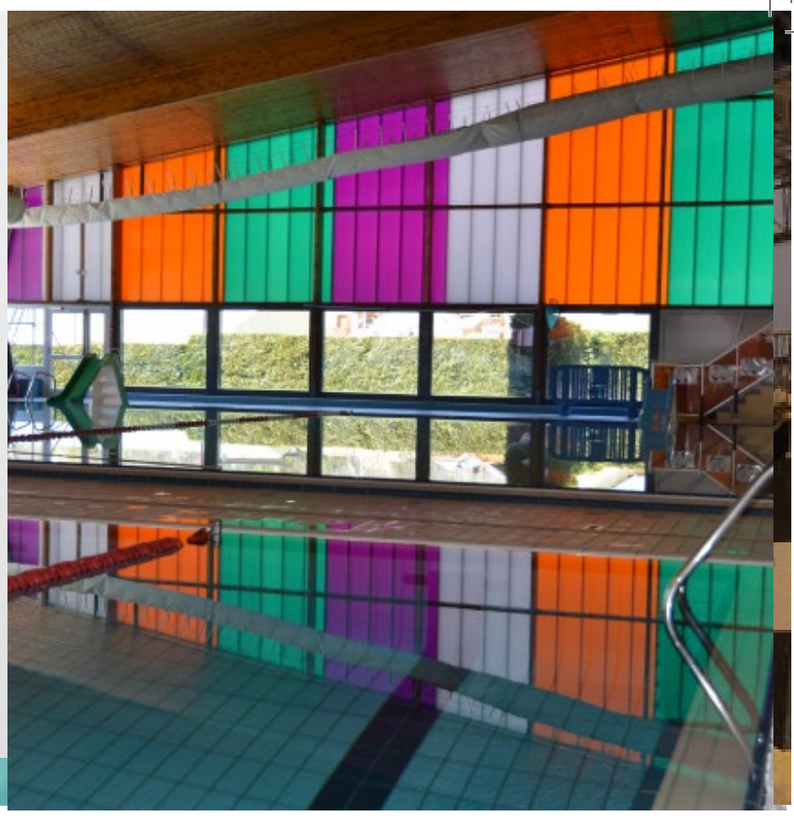
VIDEO https://www.youtube.com/watch?v=kVmqzJl6PGc

MODANE SWIMMING POOL

MODANE, FRANCE

ARCHITECT: BERNARD PERINO

DS SMITH PLASTICS



DS Smith was tasked with providing polycarbonate for refurbishing of the MODANE swimming pool located in Modane in the Alps region between the Vanoise massif to the North and between the Massif du Mont-Cenis and the Massif des Cerces to the South.

The refurbishment concerned in particular the basins. The main objective was to improve the **thermal performance** of the building envelope and to create a visually appealing structure as it is visible from the D 1006 road towards Italy.

New double skin clip multiwall polycarbonate system which was chosen for this project allowed for environmental and economic gains. The system, with its record insulation (Ug = 0,5 W/m².K), complies with the requirements of the High Quality Environmental Standard (HEQ). The system has as well **high acoustic insulation** of 28 dB, comparable to the performance as standard double glazing (30 dB). Furthermore, in case of renovation used panels can be easily recycled.

Additionally, incorporating lightweight PC sheets in this project allows for an easy and quick installation. It offers at the same time costs and CO2 emissions savings as the light weight of the material offsets the amount of extra supports as well as the extra complex machinery.
Before proceeding with changing of the facades it was necessary to address the old laminated roof structure and in particular the supporting structures consisting of foot poles and the secondary framing.

Choosing large west glazing allowed for opening the pool's view on the outdoor spaces and green area accessible to the public. It was decided to keep the existing composition with a large glazing stripe at the bottom and a polycarbonate cladding on the top.

In order to make the pool visually attractive vertical, alternating bands of different colors of polycarbonate panels were installed.

ICEHouse™

AMSTERDAM, NETHERLANDS

ARCHITECT: WILLIAM McDONOUGH

SABIC

Situated at Promenade 93, between the historic Steigenberger Belvedere hotel and the Conference Center, it is the perfect place to have a meeting or to get some work done while in Davos.
The 2016 ICEHouse ™, a special construction with McDonough Innovation, SABIC and SAP will feature **innovation for the circular economy** and a host of special events. Access to the Davos Pavilion and the ICEHouse ™ is by invitation.
PC sheet building systems are the material of choice for cladding the aluminum walls, ceiling and roof.
The combination of **multiwall PC sheet with nanogel filler in wall and ceiling panels delivers remarkable energy savings and an improved translucency.**
These lightweight materials which meet the most stringent fire norms, available in monolithic and multiwall configurations, are used worldwide for roofing, cladding and glazing massive stadiums, hotels, and other impressive structures around the world.
The structure, referred to as the ICEhouse™ (ICE = Innovation for the Circular Economy) will be located at a prominent and central location in Davos.
The Circular Economy is based on a system of product design that breaks the typical take-make-dispose flow of material resources and replaces it with designs that do not waste materials and energy and are inherently restorative through reuse, recycling, recovery, regeneration of the embedded materials.
The ICEhouse ™ is designed to illustrate the value provided by robust technical nutrients in combination with **advanced architectural design** to achieve Innovations in Circular Economy.
The external aluminum space frame structure of the ICEhouse™ is comprised totally of 2 basic aluminum members that can be rapidly assembled with simple hardware and tools to achieve light but strong floors, walls and overhead components. The structure can be disassembled and reused over and over for many construction purposes.
While the ICEhouse™ is intended to be **a demonstration of Innovative Circular Economy thinking,** it also represents a prototype structure for easy to assemble and disassemble structures based on the two part space frame structure. Such an easy to assemble and disassemble building serves a major global social need for people throughout the world that find themselves in an extremely distressed situation due to political conflict, environmental or natural disaster. During Davos, the ICEhouse™ will not simply be something to look at, it will be used extensively as a business meeting place for sponsors and various WEF global agenda council events as well as an elegant place for informal receptions for up to 80 people.

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INNOVATION

"Innovation is taking two things that already exist and putting them together in a new way"

Tom Freston

BREATHING SKINS SHOWROOM

Mandelbachtal, Germany

ENGINEER: DIPL.-ING. TOBIAS BECKER

COVESTRO

The essential function of architecture is to draw a protective line to nature. **Breathing Skins searches for simple technical solutions for a healthier room climate and a new spatial experience**. The initially separating building's envelope turns into an adaptive media of exchange, able to climatically dissolve the border between inside and outside.

The showroom indicates that polycarbonate sheets in architecture can be more than just a transparent glazing. Their great mechanical property and workability in bending and milling offer to integrate adjustable functions for future buildings of any utilisation, that response to the user's changing need.

From the beginning, architecture isolates humans from the rigors of nature and strangers. Recent trends of energetic more efficient building systems force this shielding. Highly insulating building materials have been synthesized in energetic extensive processes by non-renewable resources. Hermetic secluded rooms ask for intelligent building automation to mechanically control room-temperature, air change per hour and relative humidity. The project Breathing Skins doesn't understand indoor as an anthropogenic enclave with artificial climate, instead as a part of the outdoor and the climate of the natural environment. The inspiration for a new room experience comes from conveying the qualities of the exterior into future working and living spaces. A new responsive architecture, that changes locally the permeability for air, light, and views, could precisely alter the space to the user's changing needs and habits.

The Breathing Skins technology is based on the idea of a skin that breathes through adjustable air channels. These channels can be closed pneumatically through the application of air pressure within the facade. On every square meter, 140 air channels are controlled without any visible technical installations. An air change rate of 13 per hour is feasible without any undesirable airdrafts. As the pneumatic muscles are just 0.2mm thin, the deformation processes, operated by a pneumatic actuator, require minimal energetic input. Slight under pressure opens the pneumatic muscles that are joined reversibly between two multi-perforated polycarbonate sheets and can be separately dismantled and recycled. The more they widen, the more the appearance of the facade changes.

In the Breathing Skins showroom the Breathing Skins technology can be experienced and tested under realistic conditions. **The facade's soft and fluent shape mirrors an organic skin**. It amount a length of over ten meter and an area of 25 m². Geometrically, its layout is determined by six circular segments with different radii. **To achieve the appearance of a continuous skin, all constructive parts are assembled by polycarbonate**. The facade is separated into 14 curved elements including one door element without pneumatic muscles. The facade elements are built as sandwich construction with less than 11kg/m². A frame, two perforated sheets and stabilising pipes serve for full stability under loads. Pipes and air channels are arranged in overlapping triangular grids of different scale, that result in the facade's characteristic pattern. Around 2800 air channels are integrated into the facade and demonstrate the impact of both translucent and opaque pneumatic muscles.

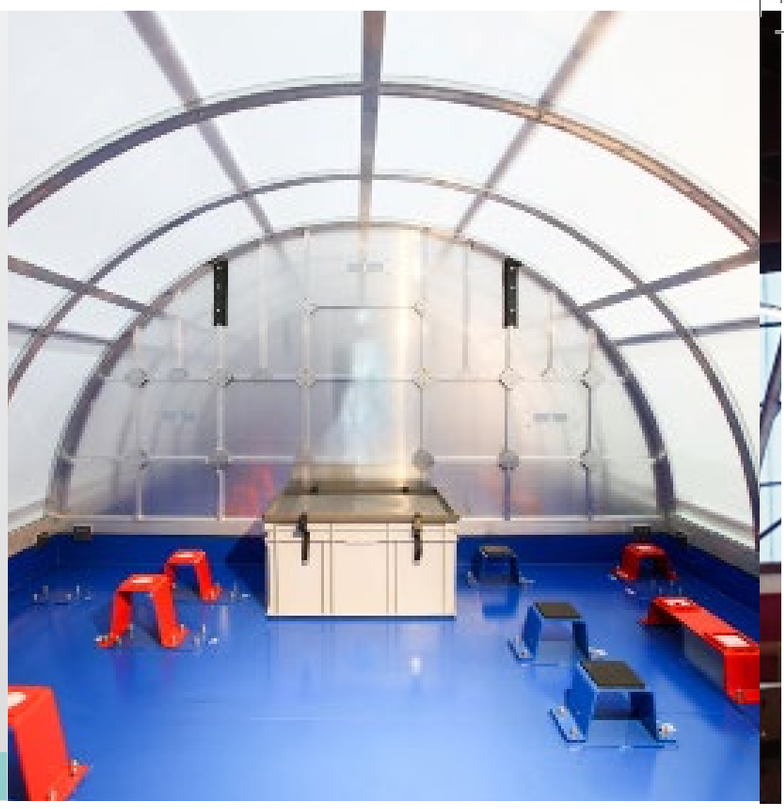
VIDEO: https://vimeo.com/158980746

DAHER – AIRFREIGHT CONTAINER

DERBY, UNITED KINGDOM

MANUFACTURER: DAHER

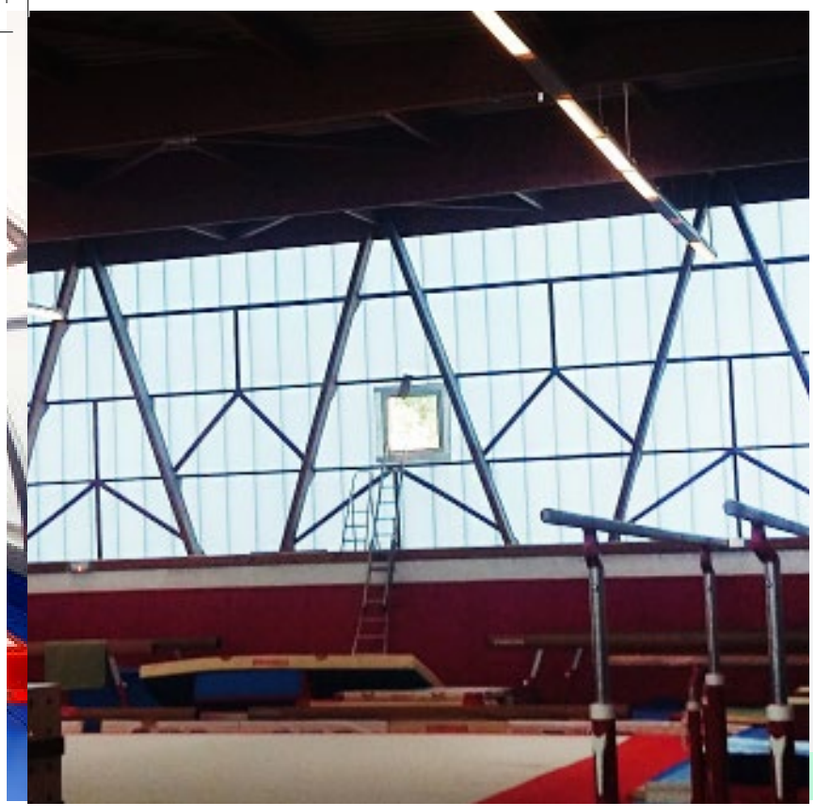
BRETT MARTIN



Daher's UK based teams specialising in Aerostructures & Systems were working with a major aerospace engine manufacturer to find a solution to replace an ageing fleet of containers used for transporting large aero engine parts around the world.

The existing fleet, made from plywood and steel is used to transport components by road from the UK to France and by Air-Freight all over the world. The conditions in which the containers are used lead to damage and decay as they are open to the elements and mechanical handling equipment. Hence, regular repairs and refurbishments are naturally an unwarranted ongoing cost. In addition, the total weight is an important issue to control due to the airfreight payload penalty.
With innovation at the core of its DNA, Daher was looking for a step-change in technology to create a more durable and universal solution for its client. They approached Brett Martin Daylight Systems in Coventry for a solution having seen a polycarbonate barrel vault on their website.
Using polycarbonate in a new context, this bespoke project achieved its key objectives through innovation. Firstly, a '**lightweight solution with maximum strength and rigidity**' was achieved through using materials of the highest quality and specification.
Secondly, a '**solution offering easy maintenance and repair**' was achieved by designing a system to take account of potential handling damage. The structure enabled standardized components to be replaced in the event of a repair being necessary.
Thirdly, a solution which showcased '**visibility and security**' was developed through the integration of an access door with a 3mm Marlon FSX Longlife Clear panel in each unit. A double locking system was also devised to prevent the possibility of the door opening in transit.
Finally, '**longevity**' was achieved through using a material with a lifespan in excess of 20 year's UV protection. All in all, such a dynamic and flexible solution for freight containers can be easily adjusted for other applications around the world.
Following a site meeting and an exchange of ideas and specifications the Marvault AF, was proposed. **Due to the requirement for portability, strength and rigidity the natural choice for the glazing was 4mm opal polycarbonate**. An all-aluminium reinforced base frame and glazing bar structure was designed to mate with the custom built container base constructed by Daher. Two prototypes were built initially as proof of concept and the design standardized for subsequent production versions thereafter.

As the units required polycarbonate sheet longer than that available in small quantities it was necessary to devise a waterproof jointing system. This was accomplished by using a polycarbonate H section and MS-Polymer adhesives. Also, as the prototype custom-built base unit was being made in Derby and, at the same time, the Marvault was being constructed in Coventry, it was necessary to manufacture a special interface fixture to replicate the base unit. This enabled the Marvault to be assembled with two elements combining perfectly which in turn reduced prototype lead time.



SPORT HALL

WISSOUS, FRANCE

ARCHITECTS: AGENCE URUK V PARIS

DS SMITH PLASTICS

The **double skin polycarbonate system** used in the refurbishment of the Sports Hall in Wissous is innovative for a number of reasons.

Firstly, this polycarbonate system is made of 2 clip panels of 40 mm each separated with the 40 mm space which creates a space filled with air. This unique structure allows for a record thermal insulation for polycarbonate: Ug = 0.5 W/m².K which is more performant than triple glazing.
The excellent performance of this polycarbonate system allows for designing complex facades which allow for a high level of natural light penetration. Natural light is no longer limited with partial polycarbonate glazing.

Furthermore, joining the 2 skins systems results in an increased distance between supports, up to 3 m. From the aesthetic point of view it allows for limiting the number of supports which can be easily visible and gives the facade its 'lightness'.

Finally, as polycarbonate is a very light material, its weakness for large and complex facades is often th esound insulation. However, with the double skin polycarbonate system used in this project, sound insulation is considerably improved, resulting in 28 dB **acoustic co-efficiency**. This is the result of the unique structure of the two polycarbonate layers, 40 mm each. This co-efficiency can be even increased up to 34 dB by adding a solid polycarbonate sheet between the two, 40 mm thick panels.

In this renovation project of Wissous sport Hall, blue double skin polycarbonate system was used to replace a simple polycarbonate cladding to cover a complete façade. The particular method of installation of this system makes the metal structure behind almost invisible and lets the natural light penetrate the inside of the building. Due to its excellent technical parameters, double skin polycarbonate system was chosen as it conforms to the European norms: high thermal and acoustic insulation.

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DESIGN

"Design is not just what it looks like and feels like. Design is how it works."

Steve Jobs

THE FOUR SEASONS HOTEL

EPSE AWARDS DESIGN WINNER

ARIEȘENI-VÂRTOP, ROMANIA

DESIGNER:

BRETT MARTIN

The Four Seasons Hotel is situated in Arieșeni-Vârtop in the heart of the Apuseni Mountains, one of the few areas in north-western Romania developed for skiing. Since its opening in 2005, the hotel that had been built in traditional Romanian style, had outgrown itself and was lacking a central entertainment space for guests. The architects were tasked to design a modern extension to integrate the new requirements into the existing building, without losing its heritage of traditional roofs found on the old houses scattered in the mountain area.

As the extension had to be built into the side of a cliff, the weight of the glazing material was a key consideration for the architects to ensure a structurally safe building. **The exceptional strength to weight ratio of polycarbonate proved to be fundamental to achieve the demands**. Combined with its high impact strength, UV protection, excellent light transmission and ability to be cold curved it was clear from the start that polycarbonate was the product of choice to realise the architect's vision.

The design of the new extension was inspired by the Sydney Opera House. The roof needed to be steep to avoid accumulation of snow, as snowfall during winter can easily reach two meters. The hotel is located in a mountain area at 1200m altitude, where temperatures can drop in winter as low as -20°C. **To ensure proper insulation during the most important ski season, a double glazed façade had to be installed.**

The glass like transparency offered by polycarbonate also was key. The façade of the new extension had to enable guests to enjoy the breath-taking views in front of the hotel. With south facing windows a transparent façade would also makes the most of the natural sunlight, providing a lighter and brighter internal environment. In addition, the co-extruded protective layer would offer extra protection, preventing 98% of UV radiation from penetrating the sheets.

The extension exists of three arched shells, all comprising flat polycarbonate. To create a continuous design, the first two sections have polycarbonate in the top of the arches. However, it is the stunning façade of the front section that creates the real wow factor.

4mm and 6mm clear polycarbonate sheets were used to create 16 uniquely shaped triangles to form the impressive double glazed façade. The entire glazed front section was built positioned flat on the ground. This way templates could be made for the unique shaped polycarbonate triangles, using cold bending techniques on site, before it was finally positioned vertically.

The use of polycarbonate enabled the architects to create a strong and safe structure, it gave the building the insulation the climate requires, its clarity created a spectacular view, whilst providing a light and bright internal space. But most of all, **the use of polycarbonate had fulfilled their vision of creating a stunning modern building that sits perfectly amid the more traditional buildings** of the Romanian village.

SWIMMING POOL RAMLE

RAMLE CITY, ISRAEL

ARCHITECT: NACHMAN ATSHTEIN

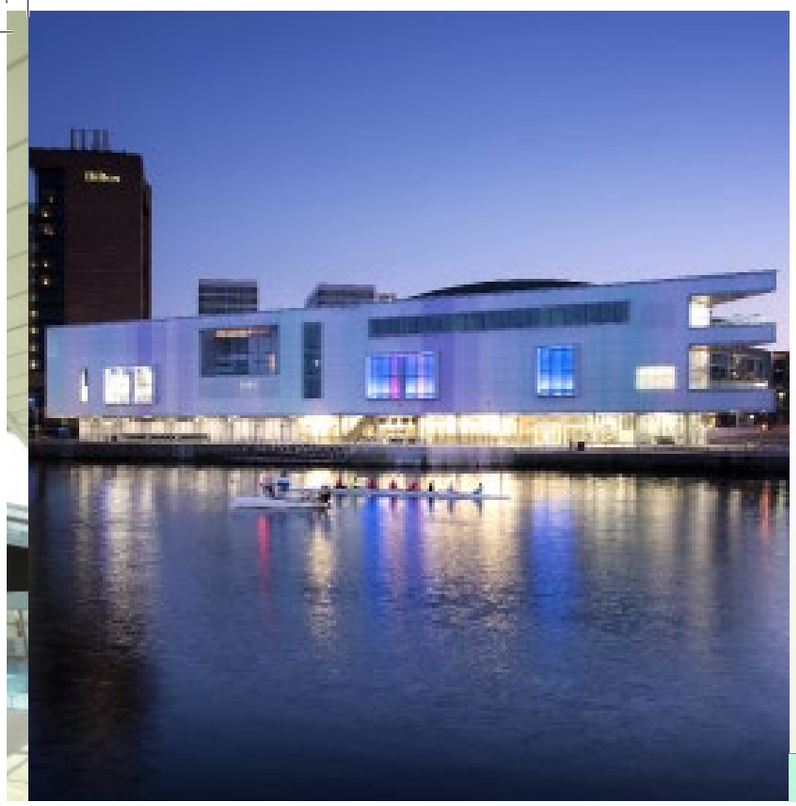
PLAZIT POLYGAL

The roof of the Swimming Pool in Ramle is made out of an integrated system of fixed and moving multiwall polycarbonate sections.

The central structure of the roof covers a surface of 2.630m². It is propelled by electricity in order to enable opening or closing of the roof allowing respectively for more or less **daylight penetration**. The fixed roof, on the other hand, covers an area of 1.600m² and provides protection for the part of the pool destined for infants'.

The polycarbonate system used in this project is waterproof and can be used for a number of different buildings, i.e.: industrial, private or public.

The polycarbonate is supported via a steel structure. The periphery is closed with an aluminum system which incorporates triplex glass.
The gables of the building are covered with "Paldeck" which imitates the trumpet tree (tabebuia).



BELFAST WATERFRONT

BELFAST, NORTHERN IRELAND

ARCHITECTURE STUDIO: TODD ARCHITECTS

BRETT MARTIN

Belfast Waterfront has had a £29.5 million transformation into a world class international conference facility. The fully integrated and bold new extension which opened officially in May 2016, is characterised by **a striking semi-transparent and colourful polycarbonate façade** that forms a dynamic frontage to the River Lagan. Featuring two interconnecting multipurpose halls, the stunning new extension at Belfast Waterfront features a 2000 seat auditorium and an additional 4000 m² conference facility which includes a 2000 m² major hall and a minor hall of 750 m².

To create a building of such high architectural quality on the riverfront, Brett Martin's innovative and thermally efficient glazing system, was used to build the eye-catching, 150 meter long colourful façade. The façade, glazed entirely with multiwall polycarbonate panels, has been cleverly designed with a graduated transition of colour along the elevation. The result is a show stopping **glazing solution that changes colour depending on how the light hits the building** during the day and lights up beautifully when the building is lit at night. Polycarbonate panels have been a key design feature in helping this iconic building create its own identity.

The entire 150 m long riverfront façade of Belfast Waterfront was wrapped with over 1750 m² of multiwall polycarbonate with many panels approximately 14 m in length. The key feature of the polycarbonate system used in this building is the lightweight panel with integral interlocking connections that simply click into place forming **glazed areas of unlimited size and shape**. For a glazing system which would not only maximise daylight but also offer exceptional air tightness, durability and UV stability, **polycarbonate sheets proved the most adaptable solution** and ensured a fast and straightforward installation.

The Belfast Waterfront site was constrained by the abutting River Lagan and had a number of contractors working in the same confined area at any one time. With many of the panels at almost 14 m in length, it was important that the material was easily handled and installed. The **light weight polycarbonate panels** were suitable to be removed from the pallet by hand and the click and fix connection system allowed it to be installed into place with ease.

The colour of the glazing panels for the façade was also a key consideration. Brett Martin created a palate of seven colour samples in a range of tint variations. These were installed at a high level on-site to allow the design team to decide on three completely new colours – petrol, viola and glass green - which were each extruded in two different intensities, creating a graduated flow of colour along the elevation. **The use of polycarbonate glazing panels enabled the architect to create a stunning variation in colour and transparency, so that the façade appears to change depending on the time of day and how the light hits the building**.

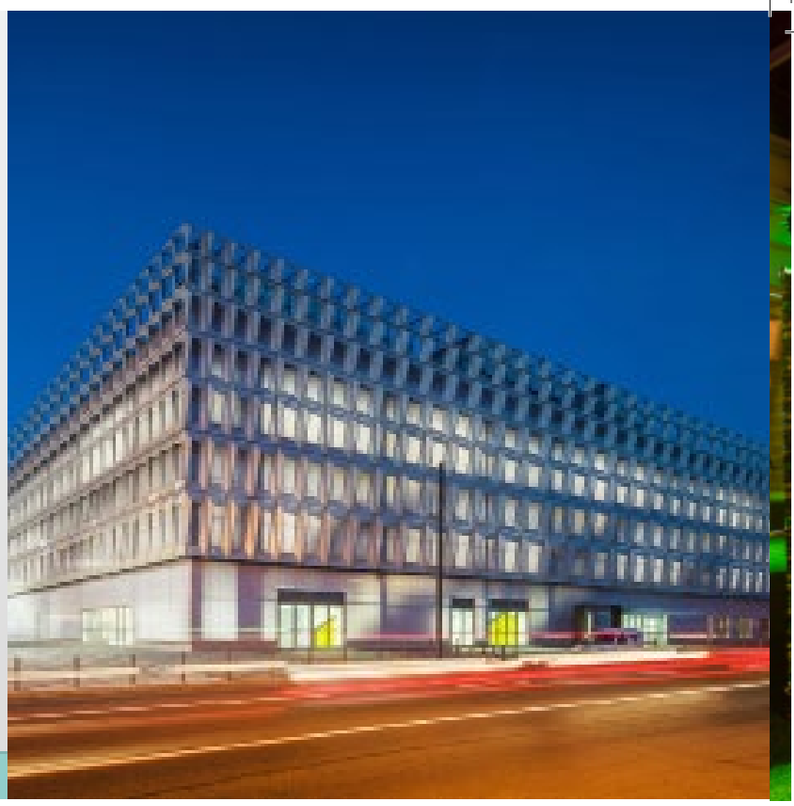
VIDEO: https://youtu.be/ZudhPEis2p8

CLUJI MULTIPURPOSE CENTER

CLUJI NAPOCA, ROMANIA

ARCHITECTURE STUDIO: DICO SI TIGANAS

DOTT.GALLINA



This sports facility is located in front of the FIFA certified soccer stadium in the city of Cluji Napoca. With an area of 38.410 m2 and a capacity of about 10.000 seats it is the largest, most modern sports and cultural center in Romania. **The 4 facades of the building have a net area of about 4.800 m2 and are characterized by an excellent thermal insulation**.

The building is divided into three areas. The first one is the VIP and technology area that fills three floors (ground floor, 1st floor and 2nd floor). There is an input level, an entrance lounge area, meeting rooms, VIP hotels with conference rooms, administrative offices, parking, Local Hardware and surveillance. Access to this area is through Power Plant Street.

Another area is the public area for the audience, it has an access via the Fitness-Stadion square. The audience is arranged on three floors of which the first two are designed to provide vertical and horizontal public access to the Hall. The third floor plays an important role in emergency evacuation.

The last area is the area intended for athletes. It is located on the ground floor and it incorporates two game fields for two teams, a room for coaches, meeting offices, rooms for medical tests and doping, storage attachment gym, equipment storage. There is a public restaurant and an area with commercial spaces they both have a separate access from the outside.

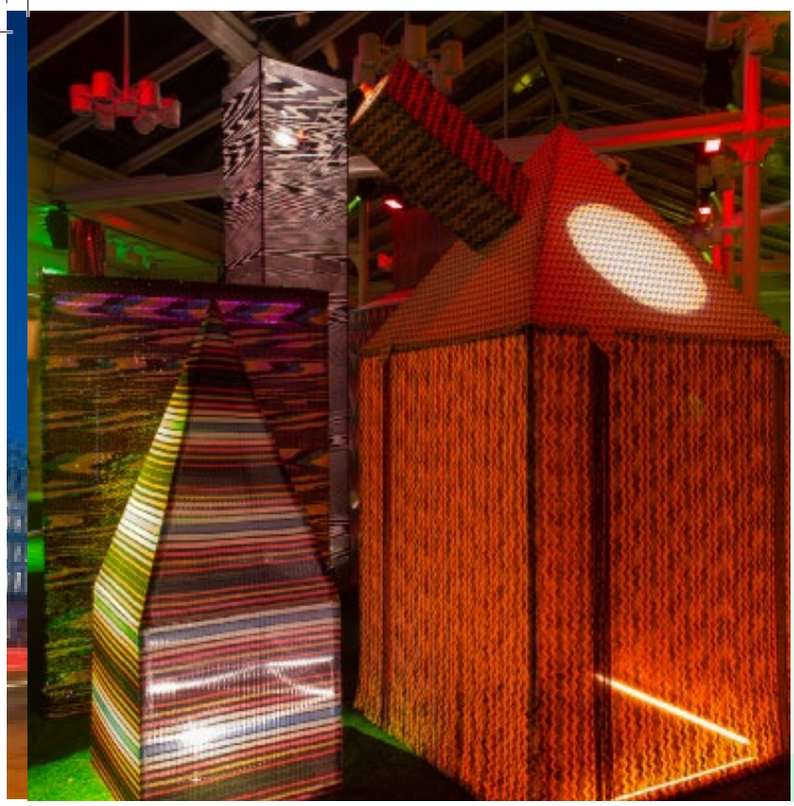
The search for energy savings and its minimal impact on the environment in the context of the building envelope was a prerogative. **The use of polycarbonate in the facade has contributed significantly to an excellent thermal insulation and good light transmission.** The building is equipped with a rainwater recovery system, and water for bathrooms is heated with the energy from the solar panels. In critical situations the demand for electricity can be still met thanks to the photovoltaic system.

When designing this project the architects had in mind a number of "green" solutions, which allow for example for the minimum energy consumption.

The delivery time estimated for the construction of this building was around 36 months, however, the work was completed prior to the due date which resulted in only 19 months of construction.

The front part of the building uses polycarbonate extensively which results in creating a structure consisting of a plate in 40 mm polycarbonate and the facade in 7 mm which incorporates about 40 cm interval creating an air chamber, with an additional 20 mm thick panel and 4 mm walls. This allows for thermal insulation equal to 0,58 W\m2°K.

Polycarbonate was installed in total for about 9500 m2. **Opal color gives the building elegance, lightness and style which blend well with the aesthetics envisioned by the designer.**



KNITOW MISSONI

MILAN, ITALY

DESIGNER: ALDO LANZINI

DOTT.GALLINA

KNITOWN is one of the first artistic examples combining polycarbonate and fabric in a mutual exchange, bringing together with perfect symbiosis the aesthetic and tactile properties of both materials. It's a symbolic example of two products commonly used in very different contexts can together increase each other's value in innovative application fields.

KNITOWN is not simply an art-installation designed for an event. In terms of sustainability and reuse, it can be considered as a representative case-study to express the potential of combining materials in design and furnishings. It is also a prototype which can be used for educational purposes when developing reproduction tools to represent possible realities and sensory experiences. Regardless of their initial use, all the materials can be reused for a traditional application and/or can be completely recycled.

The transparency and the mechanical strength of the multiwall polycarbonate components are fundamental features for the creation of bright and transparent volumes, valorizing the distinctive cloth texture of The Fashion Company.
The PC panels are used to achieve self-supporting shapes that are light permeable. Moreover, the rigidity and the flatness of the surfaces allow the perfection of the interlacing wires to be seen. Thing Led-strips have been placed inside the cells to generate dynamically colorful surfaces.
In a sort of parallelism between reality and metaphoric world, this project could be considered as the representation of the potential of PC sheets in design architecture. Indeed, PC panels can be used on any external surface to wrap an entire building (roof, wall or window in vertical, oblique and horizontal planes). In fact, the new architectural trend in contemporary cities is incorporating into the urban context while increasing energetic performances: colors, attractive shapes, transparency, thermal management and lighting maximization have become 'cornerstone' elements.

KNITOWN is a setting designed by the artist Mr. Aldo Lanzini (with the creative direction of Mrs. Angela Missoni and with Mr. Angelo Jelmini as Executive Manager) who created the SPACE MISSONI for the International Fair 'Salone del Mobile' in Milan. A surreal scenery formed with an aggregate of mini-architectural textured elements to stage a dream. Looking like a tiny skyline made of several buildings with doors and windows, everything exudes a soft and colored light thanks to emblematic knitted fabrics that decorate the surfaces.

This exotic city is pervaded by suggestive sounds which have been created through live performances to engage the visitors and involve all their senses. KNITOWN is the background for which geometries (waves, stripes, and corrugated profiles) tell a story. In fact, this symbolism characterizes the Missoni's brand from the memory of the past to the present vitality. In this small representation, Missoni Fashion is identified in a world where its distinctive textures achieve indoor and outdoor spaces with color and joy. This metaphor of an ideal world joins the chromatic fantasy, cloth drawings and musical notes in order to evoke the power of creativity featuring innovation.
The combination of different materials such as fabric and plastic is enhanced by the luminous transparency and glow, giving a new architectural value to the iconographic sign of the fashion house.
By changing observation positions, the buildings' shapes can emphasize or mix the decoration features.

PALASPORT FOR GYMNASTIC & FENCING VENUE

UDINE, ITALY

ENGINEERS: ING. ROBERTO REGNI, ING. MARCO BALDUCCI
ARCHITECTURE STUDIO: STUDIO ZOPPINI ASSOCIATI, HILSON MORAN
GEOMETRICIAN: PAOLO GENTILI

KOSCON INDUSTRIAL SA

The building was constructed by using two materials: black steel panels as well as **coloured and translucent polycarbonate**. It serves as a multipurpose center for sport.

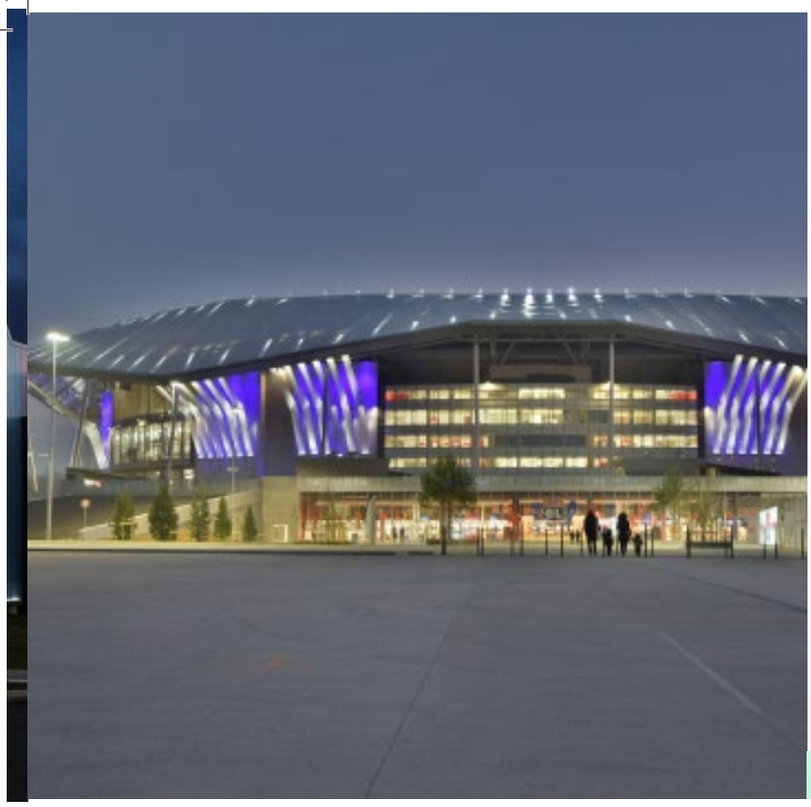
Palasport is characterized by a modern design. The idea behind the project was to portray and achieve an effect of a sort of a 'dematerialization'.

The project presents a prism which combines two parts and it is the cladding which differentiates these two parts.
Polycarbonate multiwall sheets were best fitted to achieve the effect of 'dematerialization'. **PC sheets are used for the envelope of the building which create a spacious and airy facade around the building.**

The sheets are arranged in vertical strips to produce a specific sequence of colours: purple, blue, pale blue and green. The translucent nature of the material brings real lightness to the building's image during the day with reflections flitting across the panels with change with the amount of light.

At night, the continuous line of lighting around the base and at the top of the air space between the envelope and the actual building creates quite striking effects, with a strong lighting at the bottom and top of the construction which dissolves into a gentler one.

The black part of the building in electro steel sheet constitutes the entrance to the Palasport and contrasts with the main multicolored structure and its lightness. The idea here was to play with the opposites and to accentuate the difference between the two materials.



PARC OLYMPIQUE LYONNAIS

LYON, FRANCE

ARCHITECTURE STUDIO: POPULOUS

BRETT MARTIN

The Parc Olympique Lyonnais, nicknamed the Stade des Lumières (stadium of light), is a 59,186-seat next generation multi-purpose arena in Décines near Lyon. The stadium, which officially opened in January 2016, is the new residence of French football club Olympique Lyonnais and hosted many of the EURO 2016 games as well as the final of the European Rugby Cup 2016 and will host the opening and final games of the Female Football World Cup in 2019.

As part of the design of the stadium 7688m² of clear, 1mm thick corrugated polycarbonate sheets where incorporated into the canopy roof. The rooflights, a key feature allowing the stadium to become a beacon of light at night, were specifically designed to reflect the essence of Olympique Lyonnais, the city of Lyon, and the famous Fête des Lumières.
The decision to use corrugated polycarbonate sheets in the inner section of the canopy roof was due to the many benefits the material offers, including: light transmission, easy installation, easy maintenance, and cost effectiveness, lightweight material yet durable and impact resistant.

The design objective was to create a building which is a perfect marriage between nature and technology; a stunning stadium that respects its surroundings. The design takes inspiration from the unique relationship that Olympique Lyonnais' fans have with their stadium; for example the North and South Stands have been designed to respect and facilitate the OL fans' tradition of singing to one another during games, creating a cacophony of noise and support.

The experience of the supporter is always at the heart of a stadium. In order to maximise the atmosphere created by the fans, the stadium is enveloped by a huge roof structure, creating a canopy effect which echoes the local forests; protecting the spectators in the stands, amplifying the noise within and extending over a large part of the podium surrounding the stadium. This covering allows the match day experience to be extended, creating new spaces for fans to come together outside of the venue.

One of the key design considerations was to create a beacon of light when the stadium was light up at night. **The use of clear polycarbonate sheets allowed for the impressive lighting of the stadium to escape the canopy roof and be seen from afar.** This combined with the transmission of natural daylight into the stadium during the day to create a bright and airy environment for spectators whilst also providing the perfect environment for healthy grass growth and an attractive pitch with no shadows for televised matches made corrugated polycarbonate the perfect material for the canopy roof.

Another type of polycarbonate profile was chosen to match with the corrugation of the metal roofing sheet to allow for a seamless transition from the metal roof to the polycarbonate canopy.

NOTES

LIST OF PROJECTS PER CATEGORY

SUSTAINABILITY

INNOVATION

DESIGN

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