VELUX Modular Skylights bring natural light and fresh air to learning at Tullibody South Campus

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Over 55 modules of the VELUX Modular Skylight system have been installed in the recently completed Tullibody South Campus, a highly innovative complex incorporating not only 3 educational spaces but also diverse community facilities. Integral to this transformational project was the need to maximise natural light and the availability of fresh air in the deep central area as well as over the new nursery. VELUX Commercial worked closely with architects, Keppie Design and main contractor, Robertson Construction, to deliver a tailored lighting and ventilation strategy that would ensure that Tullibody South Campus would be a healthy, bright and welcoming environment for both pupils and their teaching staff as well as the local residents.

Part-funded by the Scottish Government's Schools for the Future and Early Years programme and by Clackmannanshire Council, total investment in the Tullibody South Campus was around £15 million. The local authority, working in partnership with Hub East Central Scotland, had an ambitious vision for the new campus - to use the existing site of Abercromby Primary school to bring together both Abercromby and St Bernadette's RC Primary schools, as well as to add a new nursery, to be named Tulach Nursery. In total, the campus would provide an impressive 700 places for children under the age of 11. A combination of modular skylight solutions; VELUX Ridgelights, VELUX Wall-mounted Longlights and VELUX Northlights were installed by specialist roofing company, Skylight International Ltd from Glasgow, to create a natural ambience conducive to the well-being of the children.

The campus was also to serve as a "locality hub", with clearly defined access points for local residents. For the Council, the integration of these educational and community facilities on one site would ensure that that they would be sustainable, the overall operating costs would remain affordable and the needs of the community would be better met. During school hours local residents would be able to visit reception and the community library and make use of a single meeting room. Outside of school hours, however, they would be allowed to use the campus's central staircase to visit the modern leisure amenities, including sports hall, studio and gym, the full library and dining hall as well as additional meeting rooms. Above this main circulation staircase and feature wall, VELUX Wall-mounted Longlights were installed to highlight these architectural elements as well as to provide a welcoming feel to the space.

USING MODULAR SKYLIGHTS TO ENHANCE THE WELL-BEING OF STUDENTS IN THE CLASSROOM

With statistics showing that children spend up to 90% of their day indoors, with much of that time spent in the classroom, the design of educational institutions has been changing dramatically over recent years to address the need to create lighter, brighter, and more stimulating environments for them. Indeed, HEAD's Clever Classrooms summary report 2015 stated that the physical design of the classroom can affect children's learning progress by up to 16%. Their academic performance improves significantly where classrooms can be adapted to cater for different learning modes.

At Tullibody, alongside state-of-the-art classrooms and multi-functional internal spaces for flexible learning, Keppie Design, with its expertise in the education sector, also incorporated 2 separate arenas to stimulate the children: an innovative "immersive room", a multi-sensory space that would give them the opportunity to experience an interactive learning environment and a feature tiered seating staircase for group activities.

Critical considerations in the configuration of the schools and nursery were that the children and staff should have access to plentiful amounts of daylight, be free to learn and play in calm, well-aerated spaces and should feel connected to the outside world. VELUX Modular Skylights were integral to delivering on this design intent.

The central staircase was to be "shared", providing a means of circulation through the campus during the day for children and staff, and a means of access for local residents to public amenities in the evening. VELUX Wall-mounted Longlights were installed above this staircase to maximise the daylight in this area of footfall and to create a welcoming ambience for the local residents.

Complex campus layout necessitated unique lighting and ventilation solution using modular skylights

Numerous studies have proven that good ventilation, natural light and thermal comfort are key to students' general well-being and even their mental performance. The size, orientation and location of skylights all impact on daylight levels in classrooms and atria, and the views to the outside can enhance the learning experience. Furthermore, skylights that offer multiple openings can ventilate classrooms effectively, allowing hot, stale air to escape more efficiently.

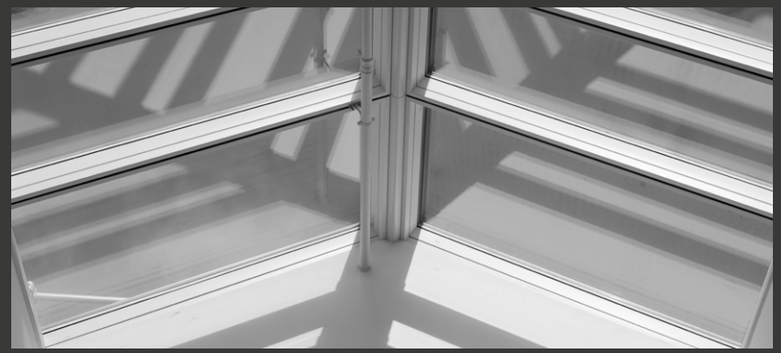
The configuration of the new Tullibody campus with its mix of primary school classrooms, nursery playrooms and central staircase, each requiring different lighting conditions, necessitated an ambitious approach to daylighting and to ventilation. As Keith Sinclair, Architect at Keppie Design explained: "Our design was continuously modelled and tested by our mechanical and electrical engineers to suit the requirements of BB101* in terms of daylighting. Each space had a particular target that needed to be achieved and the design and specification of the rooflights was included within these tests – which ultimately determined which specification we required".

Initial discussions between the architect and the contractor had revolved around designing bespoke rooflights but it was felt that VELUX Commercial would fulfil the project's requirements with its prefabricated, modular skylight solutions. Not only would they give the desired design aesthetic but they would provide sufficient natural light and fresh air to the spaces below, whilst being a much more cost-effective solution overall. Fully-tested modular skylights from VELUX Commercial would also ensure conformity to current legislation and associated guidance documents.

For the local authority, keen to use local companies and focused on delivering sustainability, VELUX Commercial's proximity to the campus site (30 miles away) was a convincing argument as was the company's established reputation for reliability and for high-quality, well-made products that offered a long-lasting life cycle.

After receiving the initial design intent drawings from Keppie Design, VELUX Commercial provided significant technical input and expert knowledge in order to find the most appropriate solutions to meet the challenges of the brief. Indeed, Sinclair paid the following compliment: "VELUX Commercial's in-house design and technical team was great throughout the whole process", explaining "The fact that VELUX Commercial could offer a number of different lighting solutions suited us as architects as it allowed us to design a variety of spaces with different lighting conditions and VELUX Commercial had a product that would suit each condition. The choice of two control systems and different glazing options helped to shape the design of the project...and the assistance of their inhouse design/technical team was invaluable in procuring the correct product/design". Once the design was completed, Velux Commercial continued to advise the architect and contractor on all aspects of the technical installation and preparation for the rooflight locations – right through to post-installation on site.

To highlight the central staircase and the feature wall, a diffused top light was required, so one row of VELUX Wall-mounted Longlights were installed, comprising 12 fixed units, measuring approximately 2200m x 1200mm. These skylights were mounted at a relatively shallow angle, 15 degrees, in order to ensure that this central, communal area would benefit from the greatest amount of light coverage.



USING PRE-FABRICATED MODULAR SKYLIGHTS TO SEAMLESSLY FIT WITHIN A CHALLENGING STRUCTURAL FRAMEWORK

The VELUX Ridgelight was a real problem-solver for the architect and contractor, successfully addressing a number of quite specific performance and aesthetic criteria. Firstly, the aperture over the 2-storey void, which housed the feature stair/tiered seating, measured approx. 3500mm, so a rooflight system was needed that could span this not inconsiderable distance. In addition, due to the location and size of the tiered seating there had to be 12.5m2 of free area to provide high level smoke control in the event of a fire. It was also the design intent that no rooflight should be seen from ground level. Together with VELUX Commercial's technical team, Keppie Design undertook a great deal of analysis in order to establish the optimum pitch for the Ridgelight (27 degrees), which would satisfy the requirements for smoke clearance and also deliver on the aesthetic design intent both internally and externally.

As Sinclair explains, "the maximum amount of daylight as possible was required to light the space, without having any direct sunlight/glare that we might encounter from curtain wall panels on the elevation". For the architect "the VELUX Ridgelight was the logical option...as it provided the most daylight, whilst also being able to have every second module openable to combat smoke in the event of fire". In fact, the VELUX Ridgelight, measuring 3500mm x 1600mm, comprised 18 smoke and comfort venting modules and 16 fixed, slightly narrower, modules.

The VELUX Ridgelight was constructed with extra strength glazing (as, indeed, were all of the VELUX Modular Skylights for the Tullibody project). This was proposed by the architect as a more robust form of glazing to meet potential safety concerns - given the shallow nature of these rooflights it was essential that the glazing could take the impact of someone, who might be working on the roof, accidentally falling on top of them, however unlikely that might be, and that it would reduce the risk for major injury. As a further precaution, the external finish selected for all the VELUX Commercial rooflights was dark grey as a contrast to the roofing material, thus clearly defining the location of the glazed rooflights to anyone on the roof. Conversely the interior finish of the rooflights was white in order to harmonise with the surrounding walls and ensure that the skyscape would be clearly visible for the kids to enjoy in line with the council's vision for a truly biophilic design.

REMOTE CONTROL OF DAYLIGHT AND FRESH AIR LEVELS TO FOSTER DIVERSE ACTIVITIES FOR PRE-SCHOOL CHILDREN

The type of lighting needed for the nursery, located in a deep area of the plan, required special consideration. Three VELUX Northlights, positioned north facing, were installed at a pitch of 57 degrees to achieve a level of light down onto the ground floor that would be appropriate for the playroom activity zones without creating unwelcome sunlight glare. In addition, the glazing for the VELUX Northlights, as for all the VELUX Modular Skylights on the campus, was equipped with solar protection designed to deflect some of the sun's heat.

The factory-fitted roller blinds, controlled by the VELUX INTEGRA® system's wall switches, would ensure that the end user would have "local control depending on the particular activity below", explained Sinclair, able to vary the amount of daylight or shade accordingly. He described the VELUX INTEGRA system as being "paramount to the success of the openable rooflights due to their inaccessible locations". A manual control would simply not have been feasible.

The campus is due to open its doors in mid-August 2019, and there are high expectations for the future. As Robertson Central East's Managing Director, David Cairns, stated at the outset of the project: "the new Tullibody South Campus will play a pivotal role in the community for a long time to come. The campus will be among the very best in the country and the provision of extensive flexible learning and external teaching spaces will allow Clackmannanshire Council to adopt the latest teaching methods and technology".

For further examples of how VELUX Commercial products have been used to create inspirational educational spaces please take a look at some of our other projects or view our dedicated blog section on Learning Environments.

*Ref: Building Bulletin 101 (BB101) – Ventilation of School Buildings" is published in support of the Building Regulations and the School Premises Regulations and provides a guide to the legal requirements for ventilation and the control of overheating in school buildings.

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