Georgia-Pacific Gypsum

ROXUL® The Better Insulation™

PROJECT PROFILE

Ridgewood High School

Norridge, Illinois

Re-Roofing to Reduce Noise Proves to Be Sound Choice for School Near Chicago Airport

The rooftop of Ridgewood High School near Chicago is a noisy place. With an extensive re-roofing project underway, two dozen workers scramble about the 120,000-square-foot surface – some of them cutting out and removing the decades-old modified bitumen over polyisocyanurate roof, while others install its replacement, a highly-specialized roofing system.

Soon, the construction noise will end. However, the blasting roar of engines from a steady stream of jets flying in and out of Chicago O'Hare International Airport, only four miles away, will remain.

Although Ridgewood High School has served the Chicago suburb of Norridge for over six decades, the airplane noise only became a problem a few years ago when flight patterns in and out of O'Hare changed. Due to glazing that was inadequate to sound isolation requirements, the presence of the original roof assembly and a lack of air conditioning that requires open windows in some classrooms, the exterior envelope of the school was incapable of keeping aircraft noise out of the classrooms.

"The noise can be so bad the teachers sometimes have to stop in mid-sentence," said Arturo Benitez of DLA Architects, who is overseeing a Ridgewood High School construction project designed to keep noise from making its way into the classrooms serving Ridgewood's 900 students.

Increased flight volumes at airports across the U.S. prompted the federal government to fund a $220 million project dedicated to helping insulate high-impact facilities against sound interference.

Ridgewood qualified because octave band noise testing confirmed that measured noise levels exceeded the 45 dbA maximum acceptable level included in ANSI S 12.60 for schools, LEED® for Schools 2009 and Federal Aviation Administration guidelines for Type 4 buildings (schools).

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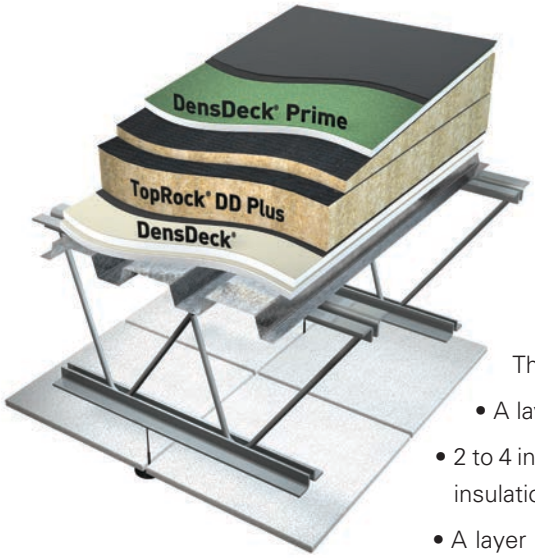

Thus, the school was included in the Chicago Department of Aviation's School Sound Insulation Program for communities surrounding O'Hare, and became eligible for federal sound remediation construction funding to bring decibel levels within FAA guidelines.

After considering a variety of options, Benitez and his sound consultant, Laurie Kamper of Threshold Acoustics, determined that a roof assembly that featured alternating layers of Georgia-Pacific Gypsum's DensDeck® boards and Roxul® stone wool insulation would achieve the desired sound attenuation levels.

The new roof assembly is layered as follows (bottom to top):

- A layer of 5/8″ DensDeck Roof Boards over the steel deck
- 2 to 4 inches (based on the taper) of Roxul's TopRock® DD Plus board and tapered insulation
- A layer of 5/8″ DensDeck Prime Roof Boards with Garland® modified bitumen membrane.

Importantly, by changing the materials above the roof deck, the interior of the building's ceiling structure has remained intact, allowing for ongoing construction while classes were in session.

According to Kamper, the 2011 published results of third-party testing* of the DensDeck/Top Rock DD Plus assembly confirmed that the construction was ideal for the project. It was the first gypsum roof board assembly tested to contribute to Sound Transmission Class (STC) ratings of up to 61 and Outdoor Indoor Transmission Class (OITC) ratings of up to 49 in roofing assemblies for commercial framed construction.

"The mass of the DensDeck combined with the sound absorption of TopRock DD Plus, in a sandwich-like configuration over the steel deck, yields the best performance in sound attenuation," Kamper explained.

STC and OITC ratings are measures of resistance of a building element (e.g., roof) to sound penetration based on different assumptions regarding the frequency content of the sound. Higher STC and OITC ratings indicate better sound resistance for the specific assumptions of the rating.

Georgia-Pacific DensDeck® Prime Roof Board

TopRock® DD Plus Fire Resistant Roofing Insulation

Georgia-Pacific DensDeck® Roof Board

DensDeck® Roof Boards are the number one architecturally-specified fiberglass mat gypsum roofing cover board. Featuring a combination of fire resistance, strength, dimensional stability and ease of installation, DensDeck roof boards enhance the performance and sustainability of roofing assemblies. The mass of the gypsum core acts as a barrier to sound transmission and has been tested to show superior sound mitigation properties.

Roxul's TopRock® DD Plus stone wool insulation demonstrates superior sound reduction characteristics as its non-directional fiber orientation helps to trap and dissipate sound waves. The product also has higher density top layer providing strong point-load resistance and effective load distribution. It is made from natural inorganic material that contains 75% recycled content. The product maintains a stable R-value over time and is dimensionally stable and won't shrink or off-gas blowing agents into the environment.

DensDeck Roof Boards are non-combustible per ASTM E 136, providing added fire resistance and safety to the building structure.

Combined with other sound remediation enhancements – such as enclosing the rooftop duct system and AV units; adding extensive amounts of Roxul AFB® for interior stud walls and roof duct enclosures; adding laminated, tempered glass windows; and installing acoustically-rated door systems in certain areas – the new roof at Ridgewood is already making a significant impact in the classroom.

"We were getting compliments even before we were finished with the roof," said Benitez. "The teachers say they have noticed a drastic improvement in noise levels from what they had previously."

"You can really tell a difference in the classrooms below the sections of the roof that are finished," added Kamper. "Those teachers are very happy."

For more information about DensDeck Roof Boards and other Georgia-Pacific Gypsum products, visit www.gpgypsum.com. For more information about Roxul, visit www.roxul.com

* Testing of the assemblies was completed at Riverbank Acoustical Laboratories in 2011.

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LAURIE KAMPER
THRESHOLD ACOUSTICS

U.S.A.– Georgia-Pacific Gypsum LLC
Canada – Georgia-Pacific Canada LP

Sales Information & Order Placement
U.S.A. **1-855-6GP-DECK (647-3325)**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

Technical Information
Georgia-Pacific Gypsum Technical Hotline
U.S.A. and Canada: **1-800-225-6119**
www.DensDeck.com

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Roxul Inc.
www.roxul.com

Canada and U.S. Technical Information:
800-265-6878

Paraic Lally
North American Manager–Specifications
Office: **905-875-9331**
Cell: **905-467-5220**

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CAUTION For fire, safety and use information concerning DensDeck roof boards, go to www.buildgp.com/safetyinfo. For fire, safety and use information concerning Roxul's TopRock DD Plus insulation, go to www.roxul.com and consult the Material Safety Data Sheet for TopRock DD Plus.

HANDLING AND USE–CAUTION DensDeck Roof Boards contain fiberglass facing which cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. TopRock DD Plus insulation contain mineral fibers, which may cause temporary skin, eye and respiratory tract irritation. Dust and fibers produced during the handling and installing of the product may cause temporary skin, eye, nose and respiratory tract irritation. Pre-existing chronic eye, skin and respiratory conditions may temporarily worsen due to exposure to dusts and fibers. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mark or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

FIRE SAFETY CAUTION Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

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Printed in the U.S.A. 2/15. GP-TM Lit. Item #622738.