The Forces You Face

Uplift Load Path

Uplift refers to the forces which can lift a structure. The forces are generated when high winds blow over the top of the structure, creating suction that can lift the roof. These uplift forces must be transferred down to the foundation to prevent damage. Several connections are required to create a continuous load path.

Although homes are built from the bottom up, they are designed from the top down. Product and load selection for the roof, for example, will affect the products and loads for the rest of the house. The tables in this application guide also begin at the top of the structure and continue to the foundation. A series of connectors in this guide must be used to complete the uplift and lateral load paths.

When wind flows over the roof of the structure, creating a strong lifting force on the roof that can cause it to break away.

When wind blows against the side of the structure, exerting a lateral force that causes it to lean over (rack) to one side.
Lateral Load Path

Wind not only affects a structure with uplift forces, it also imposes shear forces that can make a structure rack, slide, or overturn. Additional steps must be taken to resist these loads and ensure that the structure will remain strong. This is done by adding bracing, connectors and shearwalls.

Large openings along wall lines (such as windows and doors) create structural challenges in resisting these lateral loads. This is especially true at garage fronts. Such openings often do not leave a large enough wall section to provide sufficient strength. These applications will require the use of prefabricated panels to meet the load requirements.

Uplift/Lateral Connectors: Resist overturning and shear forces

Prefabricated Shearwall: An alternative to site-built shearwalls when wall space is limited

Holdown Anchor: Anchors shearwall ends to framing or foundation below

Mudsill Anchor: Transfers shear loads between wall framing and the foundation

Roof Boundary Clip: Transfers shear loads between roof and top plates

Site-Built Shearwall: Supports horizontal diaphragms and resists lateral forces

When wind blows against the side of the structure, exerting a lateral force that causes the structure to slide off its foundation.

When the structure is anchored in place to limit racking or sliding, the lateral force of the wind causes the structure to rotate or overturn.