6. Garage Door & Other Failure Modes of the Building Envelope

Why?

Garage doors are an all-too-common failure mode of the building envelope, and as such, they are damage amplifiers that can lead to more significant structural failures. While our research and countless field observations have proven the connections between garage door-related failures and subsequent damage cascades, this is just one of the vulnerable components within the building envelope that can be addressed by further IBHS research. We are poised to continue being a leader in this area, to quantify the impact of these vulnerabilities, and to educate the public on the proper installation and verification requirements.

IBHS Current Activities

IBHS has previously documented wind- and impact-rated garage door failures within commercial and residential structures, and those failures have occurred for a variety of reasons, including:

- Dislocation from headers
- Displacement off their tracks
- Improper installation (leading to the above failures)
- Flexure of the panels and resultant buckling of the door
- Debris impacts

Regardless of the reason for the failure, the building response is often the same – the subsequent internal pressurization of the building envelope poses a high risk to structural load capacity and performance. Our research on residential garage and commercial roller doors has identified ways to improve designs that can withstand such failures, but even if the door performs as expected, it is not a solid wall and can still leak, leading to some level of internal pressurization. The net effect can produce damage, meaning these doors remain a vulnerable building component and can yield a non-zero risk for losses.

What is Possible: Disaster Safety Strategy 2024-2026

Garage and roller door performance in high winds has been well documented, as have their mitigations. However, in the residential space, there remains a lack of consistency in the enforcement of code provisions that addresses proper installation and verification requirements of rated doors. In some code regimes, the onus falls on the purchaser of the doors to ensure installation meets the local code and receives proper labeling. Local loopholes and lack of enforcement on these provisions can limit the effectiveness of resilient codes within communities, which are detrimental to improving component performance and securing the building envelope. IBHS messaging can be modeled to not only communicate the *why* behind rated doors, but also *how* to incorporate them into our infrastructure to reap the full benefits of their performance.

Additionally, IBHS can and should lead the pursuits to quantify the risk components like these can present to the building envelop and create damage pathways. To better inform future research in this area, we can pursue expanding our observational dataset through post-event investigations and aerial imagery analyses. These activities will position us to more acutely identify and diagnose the additional risk these components have on overall building performance.