

Report to the Governor and General Assembly on the Warehouse Safety Standards Task Force, for the meeting held January 30, 2024

Pursuant to Public Act 102-1115, the General Assembly established the Warehouse Safety Standards Task Force to study warehouse safety standards. The Task Force is charged with providing quarterly updates of its findings, discussions, and decisions to the Governor and General Assembly, leading to a final report of recommendations by January 1, 2025.

The Task Force held its third meeting on January 30, 2024, at the Illinois Department of Labor's Springfield office at 524 S. 2nd Street. After a word of welcome from Chair Jane Flanagan and Rep. Katie Stuart, the meeting began with housekeeping items such as review and approval of the first quarterly report and meeting minutes prepared after the second meeting on November 2, 2023, and introductions.

Dr. Marc Levitan, Lead Research Engineer, of the National Windstorm Impact Reduction Program and National Institute of Standards and Technology at the U.S. Department of Commerce, began a virtual presentation on how to design buildings to withstand tornados. He discussed common misconceptions about tornados, such as that they are too rare and too unpredictable to prepare for, or that it is too expensive to build structures to withstand high speeds. He argued that, instead of focusing only on the most severe, highest-profile tornados, an approach that includes designing buildings to withstand modest tornados, which are more common, would significantly address most dangerous situations.

Since the tornado that hit Joplin, MO, in 2011, experts have studied tornado damage to structures and have developed new building standards. Buildings are divided into Risk Categories (RC) based on a combination of factors including maximum occupancy and the risk to human life in the event of structural failure. RC III and IV represent buildings such as hospitals that, in the event of failure, pose a substantial risk to human life, Shops, restaurants, and warehouses usually fall into a lower Risk Category, such as RC II. The International Building Code (IBC) requires greater "tornado load requirements" (ability to withstand higher speed winds) for buildings in higher Risk Categories. Since 2015, IBC has required tornado shelters in schools and emergency response facilities; but states do have the ability to go above and beyond. In fact, Illinois statutorily enacted requirements that newly constructed schools have tornado shelters even before the 2015 IBC requirement was enacted.

Dr. Levitan also addressed another common misconception: that tornado shelters must have fully functional restrooms with running water. He said this misconception deters construction of tornado shelters. He advised that the restroom requirement is much less stringent than believed and can be achieved without plumbing by spending less than \$100 on supplies.

Dr. Levitan posited that there are two approaches to ensuring tornado safety in buildings: build a tornado shelter inside the structure; or improve the wind resistance of the whole building. The State could require some or all RC II buildings (such as warehouses) to meet the higher standards applied to RC III or IV buildings; or could require a minimum tornado design speed or intensity. However, these standards are most easily achieved when contemplated in new construction. For existing buildings, options include retrofitting buildings by installing internal storm shelters or constructing standalone shelters adjacent to existing buildings. He argued that internal storm

shelters can serve dual purposes by also being a breakroom. He said a 1,000 ft travel distance is standard to ensure occupants can reach the shelter in 5 minutes or less.

Senator Rachel Ventura asked Dr. Levitan his opinion on insulated concrete forms (ICF), a new construction method. He said ICF is a great construction technology, though building codes are "agnostic" on the technology and don't make recommendations on specific construction types. Rep. Katie Stuart asked for further clarification on Risk Categories and how they are calculated. Dr. Levitan explained that higher occupancies, as well as whether the occupants lack the ability to act freely (such as in a school, nursing home, or jail) result in a higher Risk Category. Rep. Stuart confirmed that the State could require lower-RC buildings to meet the requirements of a higher RC building. Dr. Levitan said the construction of warehouses, with tall heavy walls that rely on a roof for stability, represent a more vulnerable type of construction than traditional steel-frame buildings, and that the state could enact requirements accordingly.

Alex Cope, sister of Clayton Cope who was killed in the tornado at the Edwardsville Amazon facility in December 2021, asked about whether building code requirements contemplate mass communications systems in buildings, such as intercoms, since occupants need enough time to know they need to get to the shelter and to get there. Dr. Levitan responded that fire systems have communications requirements, but he is unaware of any similar requirements for tornados, although that certain communications requirements can be considered.

Sen. Seth Lewis asked if there were other examples of warehouse failures around the country, and how building standards and practices may have played a role. Dr. Levitan has not studied the Edwardsville Amazon facility specifically, but noted that buildings with tall, heavy walls, with a single story, and a roof that provides the bracing for the walls, tend to be less stable. If the roof is torn away, the walls come down, and because the walls are so heavy, they are particularly damaging to anyone or anything they would fall on. Dr. Levitan pointed out that the minimum standard is just that - the minimum - and building owners can always choose to build facilities that meet standards higher than legally necessary. Rep. Dan Ugaste asked for more detailed information regarding whether damage happens more to residential or commercial facilities. Dr. Levitan said broad data is generally not available, but in the Joplin tornado, the damage was widespread. He did say that 85% of fatalities occur inside buildings as opposed to outside.

Next, Greg Bryant of the Masonry Structural Coalition (MSC) delivered a presentation on best practices for construction. He noted that Illinois experiences a high number of tornados annually. He shared the story of the Parsons Manufacturing Plant in Roanoke, IL that was hit by a tornado in 2004. The external building was destroyed, but all 140 occupants were able to reach a refuge area in 3-5 minutes and there were no fatalities.

Mr. Bryant discussed that Concrete Masonry Units can be retrofitted into existing buildings. He discussed 3 types of shelters, in increasing order of protectiveness:

- [Best Availablely Refuge Areas](#) – designed according to regular building codes and don't necessarily meet the below storm-specific building codes.
- [Storm Shelters – must meet special ICC 500 building code](#); and
- [Safe Rooms – FEMA funded and must meet FEMA P-361 requirements](#).

Both ICC 500 and P-361 building codes contain requirements for travel distance, occupancy loads, fire resistance, essential features, required facilities, quality assurance plans, etc.

The Masonry Structural Coalition offered to provide assistance to the Task Force with modeling and design, structural analysis, code compliance, budgeting and scheduling. MSC is also producing a publication on storm shelter prototypes they can share with the Task Force. Director Flanagan asked Mr. Bryant to identify differences between storm shelters and safe rooms. The ICC 500 storm shelter standard has requirements for occupancy and restrooms in accordance with various classes of wind speed. The FEMA safe room standard holds all structures to a 250+ mph standard. All safe rooms exceed the standards for storm shelters, but not all storm shelters qualify as safe rooms. Anyone can access FEMA building requirements online.

The Parsons structure was built prior to the establishment of the ICC 500 and FEMA P-361 so it's unknown whether it meets those standards, even though it did withstand the tornado.

Sen. Ventura asked about changing building standards and whether new environmental standards (such as energy efficiency) could be built in. Mr. Bryant said that when he prepares estimates and recommendations, he can take those factors into consideration. Sen. Ventura advocated for a holistic approach that includes environmental and cost factors.

Sen. Harris pointed out that the best structures don't work if people don't get to them in time, and people are naturally inclined to go to the best available option in a crisis, such as a restroom. MSC representatives shared that a Registered Design Professional must identify a Best Available Restroom Area, but restrooms often do qualify because they don't have as many windows, and people do instinctually go there.

Rep. Stuart discussed the ability of individual building owners and operators, as well as the state, to enact or require higher building standards than traditionally required. She asked for details on what the state of Florida has done. Dr. Levitan shared that Florida adopted a higher standard in accordance with [American Society of Civil Engineers 7 \(standards for Minimum Design Loads and Associated Criteria for Buildings and Other Structures.\)](#)

Dr. Levitan recommended, similar to fire emergency plans, that one low-cost solution would be to ensure all buildings have a tornado emergency plan, so occupants know where to go.

Rep. Ugaste suggested that building operators could do safety talks and be required to discuss tornado response plans with occupants. He also suggested that different jurisdictions in Illinois could have minimum requirements that already exceed the standard, and that if Illinois requires an ideal standard, it could discourage businesses from locating warehouses in the state. Rep. Ugaste would rather see an option where a business chooses whether to build the whole building to withstand tornado speeds, or to include a specific internal shelter for that purpose.

Rep. Stuart raised the question of who is responsible for doing safety planning when a warehouse may be owned, operated, and staffed by 3 or more distinct entities. Anna Brown of UFCW shared that when she worked in manufacturing, she had regular drills to test emergency response. This was a business decision the manufacturer made voluntarily, and Rep. Stuart suggested the state could require all employers to do something similar. Ms. Brown shared that her union negotiated a joint labor-management monthly safety planning meeting.

Rachel Cope, sister of Clayton Cope who was killed in the tornado at the Edwardsville Amazon facility in December 2021, shared her experience working in a warehouse where the operator did not place a high priority on worker safety, and expressed that businesses will not always choose the safety option when given a choice. Marcos Ceniceros of Warehouse Workers for Justice echoed Ms. Cope's remarks, saying that what employers want is not always in the best interest of workers; and the state must do what it can to protect these workers and hold employers accountable. Rep. Ugaste clarified his preference that employers have the ability to choose how to design their spaces to be safe, but that all workplaces should be safe for their workers.

Director Flanagan recapped three approaches to safety that can be taken together or separately: building structure; storm shelter within building; safety planning. Alec Laird emphasized that different areas have different needs, but that employers desire clarity.

Director Flanagan then invited Capital Development Board representatives to discuss the new state building code. Lisa Hennigh, Deputy Director of Construction at CDB, discussed the new state building code enacted in 2023 which takes effect Jan 1, 2025. This new law requires municipalities and counties to require residential and commercial buildings to adhere to a minimum baseline building code enacted in the prior 9 years. Ms. Hennigh said the baseline building code doesn't specifically address tornados but does address flood resistance.

Director Flanagan then directed conversation towards the final report due January 1, 2025. From the Task Force's first meeting, the committee agreed to focus on emergency response, building codes, and emergency procedures. Alex Cope shared that she has looked into emergency response procedures and has a proposal to share with the group. Rep. Stuart mentioned the importance of adaptability and looking to the future. Sen. Ventura brought up the important of zoning standards in local government, and that many warehouses use temp agencies. The next two meetings will focus on emergency response plans and zoning and code enforcement.

The next Task Force meeting will be held April 8, 2024, at IDOL's Springfield office.