Floods - ICF Sustainability

Climate change is influencing the weather patterns with more rain and flooding across all of North America. Rising flood waters, torrents of water and storm surge waves present not only a structural issue, maintaining the ability of the building to withstand the water pressure, but also a health issue in cleaning up from the contaminated water for the prevention of mold growth.

Fox Blocks ICFs meet the ASCE 24 guidance for a flood damage-resistant material: durable, moisture-resistant, and mold- and mildew-resistant.

CONVENTIONAL CONSTRUCTION - materials such as lumber, gypsum board and fibrous batt insulation are very absorbent organic materials. In a flood situation, any paper faced gypsum board or insulation that was underwater is basically destroyed and must be removed. The wood framing will have a high moisture content, plus, must be disinfected and dried to get the moisture level down to 15% or less before any new insulation and gypsum board may be re-installed.

Wood stud moisture content testing – after underwater for 2 days 65%, after 2 days open air drying 35%, after 4 days open air drying drying 25%. Note, in high humidity the drying time will be longer.

This situation also applies to basements that have been underwater. Basement walls built with concrete block should be inspected by an engineer for pressure cracks created by the added hydrostatic pressure from the water on these walls. Interior wood strapping, insulation and finishes must be removed. Wood frame homes have been dislodged from the foundation by storm surge and raging flood waters. This is also an area for investigation.

After a flood subsides, a building owner has a monumental task to review the situation and make the difficult decision to repair, rebuild, or relocate. Professional assistance may be required to assess the damages.

FLOOD ADVANTAGES OF FOX BLOCKS

Review the ILC video on Flood Waters – ICF Sustainability

www.foxblockstraining.com

In all flood plains and areas prone to flooding, building with Fox Blocks will significantly help protect your building and its contents from intense and devasting flood waters.

STRUCTURE - Fox Blocks creates solid, monolithic reinforced concrete walls. Fox Blocks below and above grade walls with reinforced concrete will not degrade when wet and will maintain its original shape and integrity during and after a flood. Concrete is a not an organic product and will not promote mold or mildew. In a flood situation the concrete will absorb water, but the water will drain and dissipate from the wall over time.

EPS INSULATION – the expanded polystyrene insulation is a non-organic material and does not promote mold or mildew growth. EPS is water resistant providing minimal absorption. Any water will drain or dissipate from the EPS very quickly to achieve a low moisture content,

enabling the re-installation of the gypsum board. In a flood situation the EPS will not be damaged or degrade from being underwater. Standing flood water is contaminated and any walls in contact with this water should be cleaned and disinfected. Once exposed the EPS will dry very quickly but it should be cleaned and disinfected either with a steam cleaner, power washer or other method.

On-site testing by Fox Blocks shows that water will wick up a wood stud but not in the EPS insulation. When the water recedes the EPS, that has been underwater, will dry quickly (faster than wood) and will have a moisture content that is acceptable for the re-installation of gypsum board.

Wood studs and sill plates are recommended to dry, reaching a moisture level of 15% or less before the insulation and gypsum board may be re-installed.

CROSS-TIES – the Fox Blocks cross-ties are polypropylene plastic and are not effective in any way from water or being underwater. The cross-ties will be structurally sound for the re-installation of the gypsum board with screws.

FLOOD RESTORATION OF A FOX BLOCKS BUILDING

In the event of flood, after the water has receded and the building is safe to enter, the following steps are suggested for the restoration of the interior finishes:

INTERIOR

1. Establish the high-water line on the walls. Water will wick-up within the gypsum board so find the level where the moisture has not penetrated. Using a moisture meter, measure the moisture content of the gypsum board to find the dry, undamaged level and mark it as a cut line.
2. The gypsum board below this cut line must be carefully removed. Cut a straight edge and with a magnetic stud-finder, locate the drywall screws and remove the screws. In removing the gypsum board do not damage the EPS insulation.
3. Note - it is NOT necessary to remove any of the EPS insulation.
4. Because flood waters are contaminated, the exposed EPS must be cleaned and disinfected. Use an EPS friendly disinfectant solution, apply on to the exposed EPS with a low-level power washer or steam cleaner.
5. After cleaning the EPS, allow the wall surface to dry with fans or dehumidifiers. The EPS should have a very low moisture level after being exposed for 24 hours.
6. Allow the cleaned wall surface with the disinfectant to off gas, until completely dry, before applying any new wall finish.
7. For ease of the finish re-installation, place indicator marks on the existing gypsum board wall to show the ICF fastening strip locations. Install new gypsum board directly over the cleaned exposed EPS with drywall screws.

Note - review disinfectant solutions to be compatible with EPS. Test a sample on the EPS to ensure it will not dissolve or harm the surface.

8. Tape and finish the new walls.

EXTERIOR

Restoration on the exterior is dependent on exterior finishes over the ICF wall and the height of flood waters on the wall. Generally, clean and disinfect the wall and allow to dry normally.

- For direct applied finishes like hard coat or acrylic stuccos, these generally do not have to be removed, just power washed and disinfect.
- Any wood siding should be removed as the will have an air gap behind the wood which will have filled with flood water. The back side of the wood will be contaminated and may create mold growth.
- Vinyl, aluminum, steel or cement board siding which has been directly applied to the ICF should also be removed to disinfect the surface of the EPS insulation and the back side of the siding. The contaminated flood water may leave residue on the backside of the siding which could create mold or mildew.
- Brick veneer walls have a drainage cavity built into the wall assembly. Power wash the brick surface and confirm the weep holes are clear of debris.

SUMMARY

Fox Blocks ICFs are a sustainable product in a flood situation. The EPS and the concrete are inorganic materials and will not promote mold growth. It is recommended to clean any contaminants from the surface of the EPS. The EPS insulation does not wick or absorb water and will drain and dry very quickly.

Fox Blocks enables the design criteria for commercial buildings located in whole or in part of a flood hazard area, for construction according to the American Society of Civil Engineers (ASCE), Flood Resistant Design and Construction, ASCE 24-14, the reference standard in the 2021 International Codes® (I-Codes®) for flood-resistant design and construction.

For homes and buildings designed and built with Fox Blocks, the restoration of the wall assemblies after a flood event becomes very simple and fast, with minimal restoration costs for material and labor. The biggest threat for any wall assembly after a flood is mold growth. The materials in Fox Blocks do not promote mold growth and after proper flood restoration will provide a healthy and safe building envelope.

Fox Blocks wall assemblies meet FEMA criteria for safe rooms.

In Flood Plane regions, some Insurance companies recognize the advantages of building residential and/or commercial buildings with ICFs to mitigate damage and restoration from flood waters.

Review Fox Blocks Blog – Rebuilding a Commercial Buildings After a Flood