

Q. What is the expected lifespan of a tension fabric structure (both the steel frame and fabric)?

A. Legacy's standard fabric has a 25-year warranty, and we expect the fabric material to last that amount of time or a period longer. When the fabric does hit that point, it is easily replaceable. The significant benefit of fabric in corrosive environments is that it is non-corrosive. Clients gain the added benefits of corrosion protection, extending the life span of their investment.

The steel frame will last indefinitely if it is properly maintained – address dents, scraps and provide touch up where needed to ensure the longevity of your building. Legacy moved to epoxy steel finishes for the ease of maintenance and repair should your building become damaged.

Q. Is the EpoxxiShield™ COR system and fabric rated per ISO 12944? If yes, which class environment?

A. The EpoxxiShield system is not rated at this time by ISO 12944. The fabric is not part of a paint system, so it could not be rated under ISO 12944.

Q. Finish coat ISO 12944-2018 recommends polyurethane paint. EpoxxiShield™ specifies all coats as epoxy. What is the difference? Are ISO specs similar except for the finish coat?

A. Legacy can apply different coatings onto the epoxy. The polyurethane finish is typically used for finishes that need to have UV resistance. We have researched and tested other finish coats and ultimately, what we are offering with EpoxxiShield™ is a standard solution for our clients that is also a high-performance finish at a cost-effective price. Facilities with a different finish coat would be because the framework may be susceptible to various elements such as UV light. When the framework is wrapped in our ExxoTec™ fabric, you no longer have the risk of UV damage. Legacy's EpoxxiShield™ provides excellent value for the specific structure we provide.

Q. Maybe out of the seminar, but I would like to know Legacy's experience with concrete deterioration caused by the nitric fertilizer content. Some stores are starting to use epoxy to coat the surfaces to avoid concrete disruption. Is Legacy studying the issue considering a turnkey project?

A. We are not studying this issue at the moment. Concrete is outside our scope of work. We focus on providing buildings, working to extend the life span of those buildings. Although I would like to add that Legacy's experience with multiple building projects, epoxy paint systems have been added to the exterior of the concrete during the installation stages to extend the life of the concrete. For example, the State of Indiana applies epoxy to their concrete beams in all salt buildings.

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Also, note that when Legacy designs the foundation (walls and piers) in a corrosive environment such as salt or fertilizer, we use the recommended rebar cover required by code.

Q. In one of the slides, purlins are specified HDG + painted. Which paint scheme, and what is the thickness of the coats?

A. Our purlins are pre-galvanized, and then we apply an epoxy paint coat. It provides our customers with a layer of galvanic protection with added barrier protection with epoxy paint. Also, all tube ends are capped in a corrosive application to ensure that there is no way for corrosion to get inside the tube.

Q. Is there a significant cost difference between using galvanizing vs. EpoxxiShield™?

A. EpoxxiShield™ can provide you, especially on the larger structures, a significant cost advantage while providing you with the benefit of having superior coating protection, not worrying about the ongoing corrosion risk. EpoxxiShield™ delivers an excellent value in looking at the long-term lifespan of the building.

Q. Does Legacy design include foundation design for your structure?

A. On occasion, we will have a client who wants to keep the whole job under one umbrella, so they will ask Legacy to provide the foundation design. After the client has provided the soil report, we will give the rigid frame structure design and follow up with the client's foundation design. We will then move forward with all the appropriate stamps, permits, etc., needed.

Q. My question is a more global one (perspective challenges & solutions to corrosion): Considerable research has been undertaken to understand corrosion better. Would it be possible, one day, to have a universal (radical) solution for the Corrosion phenomenon based on the best understanding of Corrosion chemical fundamental process inception and by implementing those solutions at the design step instead of using barriers solutions to prevent it or to avoid it during operations?

A. At Legacy, we are not able to project the future of corrosion protection. Legacy's EpoxxiShield™ provides our clients with great value in corrosion protection with today's technology.

Q. I assume you are not welding in as-galvanized condition; however, in your hollow-structure pic, it looks like it was welded in as-galvanized?

A. That is correct. That image shows a pre-galvanized tubing that is welded into place. Most of the pre-galvanized manufacturer's weld with the galvanizing in place and then try and touch up the exterior. At Legacy, we do not do that. Anything we galvanize is post welded, and the same process is applied for our epoxy coatings. The process protects the steel and does not allow for damage to the surface coat from welding.

Q. Are you joining beams with PTFE coated fasteners?

A. Typically, we are not. We use HDG fasteners, and if a client requires additional corrosion protection on those fasteners, we will apply touch-up epoxy paint after they are installed. In best practices, we found that this provides the best corrosion protection and ensures the coatings on the bolts are not damaged during installation.

Q. How does Legacy inspect for corrosion?

A. Legacy only inspects for corrosion if a client asks us. If we were asked, we would go through the structure and do a complete corrosion inspection. One of the vast benefits of the Legacy design is that our tubes are capped, which does not leave you to guess what the level of corrosion could be in areas that are not visible. As you saw in the slide show, the I-beam structure framework can quickly be inspected on all sides to ensure corrosion is not impacting it.

Q. Are 303/304 stainless fasteners galvanically compatible with galvanized steel?

A. The 303/304 stainless fasteners are not asked of Legacy very often; they do not have the qualifications that A325 and A490 bolts have for the types of applications in the tables (RCSC) connection of all our connections. We can use 303/304 if specified; however, it would be something that would need careful review to ensure structural integrity.

Q. You mentioned that you occasionally join beams with stainless. Does Legacy continuous-weld beam connections?

A. Yes, we do. At Legacy, we use a pull-through welder, which pulls our beams all the way through in whatever shape they are designed in and applies a continuous bead of weld through that entire beam. This provides a perfect and consistent weld onto the beams.

Q. Is EpoxxiShield™ COR a single or dual part coating, and is it room-temp or heat cured?

A. The EpoxxiShield™ COR Elite system is a dual part system. Those two parts are mixed right at the spray gun before being applied to the steel. They are cured at room temperature, and

because they are a dual-part system, there is a chemical reaction that speeds up the curing process.

Q. Assuming beam fasteners are designed to be in tension, has Legacy seen issues with hydrogen embrittlement of larger fasteners?

A. We do have our pre-tensioned joints per code on our moment-resisting connections on all the different splices of the frame. Legacy has not personally experienced it or seen it at this time.

Q. Can you provide your source for the cost of corrosion?

A. NACE International today released the “International Measures of Prevention, Application, and Economics of Corrosion Technology (IMPACT)” study, in which it estimates the global cost of corrosion to be US\$2.5 trillion, equivalent to roughly 3.4 percent of the global Gross Domestic Product (GDP).

1. <http://impact.nace.org/economic-impact.aspx>
2. <https://inspectioneering.com/news/2016-03-08/5202/nace-study-estimates-global-cost-of-corrosion-at-25-trillion-ann>
3. <https://corrosion.org/>

Q. What structural steel material and coating do you recommend for steel catwalks in underground concrete chambers/sewage pumping stations?

A. Legacy is an expert in buildings and structures. We do not have the appropriate expertise to answer the above.

Q. You mentioned that you have zinc-rich epoxy paint. How is that different from hot-dipped galvanizing?

A. It is very similar. HDG applies zinc in a molten bath onto the steel. With the zinc-rich epoxy paint – the zinc is mixed in with the epoxy paint and then sprayed onto the steel. You get the same zinc-to-steel protection or galvanic protection. On top of the zinc-rich epoxy layer, we apply the layers of epoxy for added security. If you reference back to slide 17 in the presentation, you will see the thickness. Our zinc-rich epoxy paint is applied at 3-4 mils thick, and HDG is typically used at 3.9 mils thick. You get a very similar thickness, very similar protection, but with the epoxy system, we add 1, 2, or 5 mil layers on top of that to create the ultimate barrier protection.

Q. How easy is it to repair epoxy coatings versus HDG?

A. HDG is challenging to repair because HDG does not stop corrosion; it just slows it down, so you are repairing the entire piece. With epoxy, however, if you get damage in an area, all you must do is grind it off and re-apply the epoxy.

Q. What's the future of corrosion protection, especially for immense structures such as Legacies?

A. The future of corrosion protection is providing continued advancement and innovation to our customers. Legacy always looks at problems and solutions to offer our customers the best product for their building investment.

Q. Will epoxy coatings improve over time?

A. America is an innovative place, and thus we can assume that epoxy coatings will continue to improve over time.

Q. How did you come up with the mixtures for your different epoxy coatings?

A. Legacy partnered with PPG (global supplier of Epoxy Paint) to help develop the best solution that could be put forward for our buildings. The actual EpoxxiShield™ COR Elite system is a very typical system that is used for bridge construction. As we all know, bridge beams can be in a very corrosive environment, especially in coastal or snow areas.

Q. What industries do you watch for the latest corrosion protection technology, i.e., what can we learn from other industries?

We work closely with our suppliers, Hot Dipped Galvanizers and PPG, to stay on top of development options and opportunities for us to apply to our steel. Sometimes, customer projects have specific requirements for epoxy paints that drive us to continue innovating our products and growing as our client base grows.

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