

XPress Condulet™ Threadless Assembly System

Project Description

Our team will develop a new condulet hub design to eliminate the need to rethread the conduit. The connection between the condulet and conduit should be a compression hub that forms a secure bond. The product must also be scalable across various fitting shapes and sizes. The **Xpress Condulet™** system would eliminate the need for threading conduit, effectively streamlining the process and decreasing installation time for electricians. In addition, it must also be designed for simple replacement without damaging the conduit to ensure long-term reliability in a wide range of industrial and commercial environments. The condulet hub design must meet manufacturing and safety standards.



Eaton Threaded Condulet

Standards

National Fire Protection Association (NFPA) National Electric Code

Condulet designs for hazardous locations can combine various Class, Division, and Group ratings based on the specific hazards present. Hazards are explicitly itemized in NFPA 70

American National Standards Institute (ANSI)

Provides specific dimensions and tolerances for various types of conduits

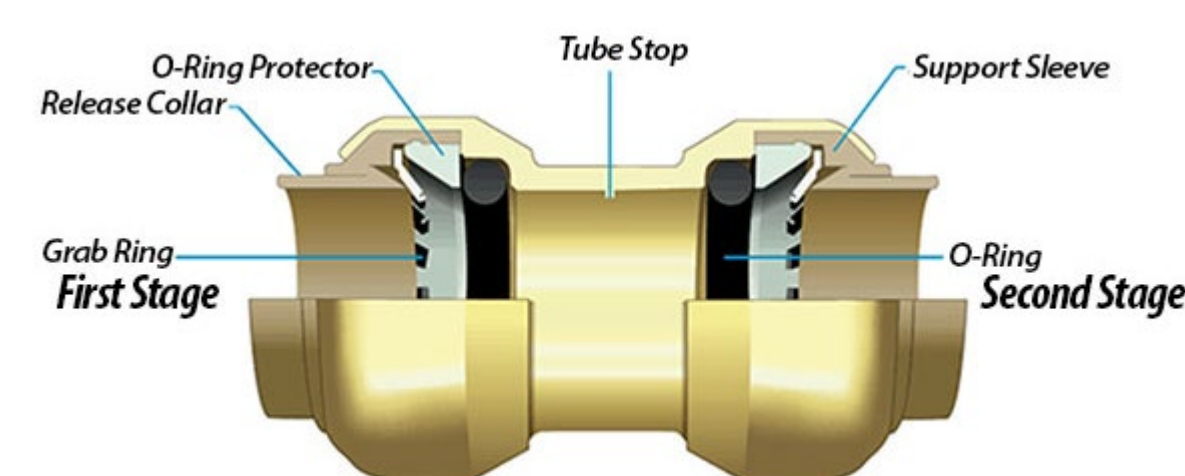
NEMA (National Electrical Manufacturers Association)

Provides material specifications for different kinds of metal conduit

Concepts

SharkBite:

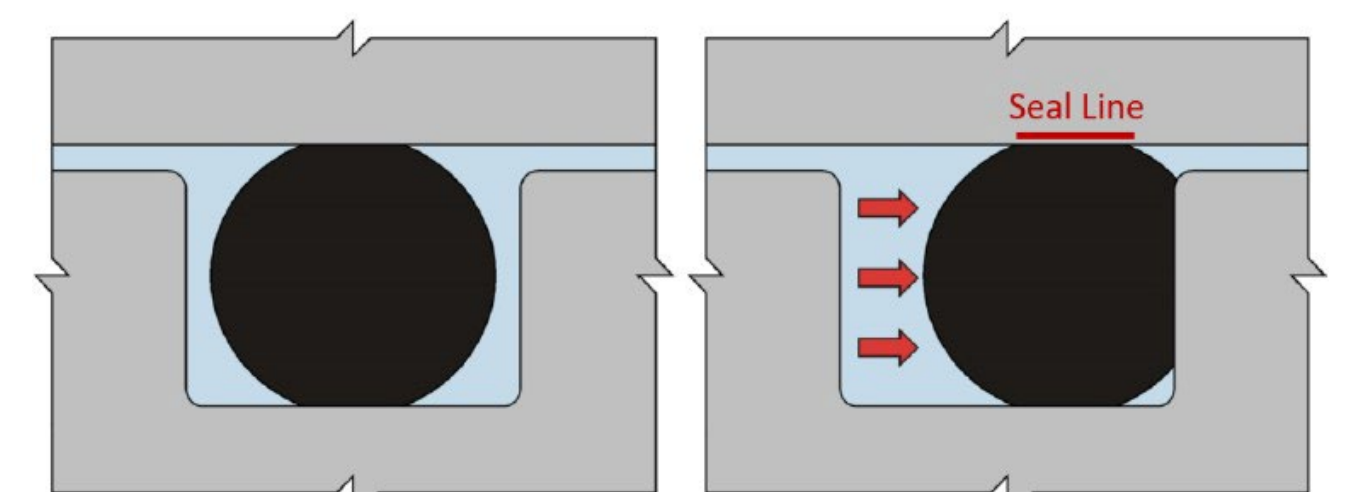
A product which creates air-tight seals between plumbing pipe without threading. They are used in plumbing, however, can be used in conduit applications if all design considerations are accounted for



Cross-section of a typical SharkBite fitting

O-Rings:

Creates an air-tight seal within a connection using a polymer, such as a rubber. As pressure on one end increases, so does the strength of the seal. Is featured in the shark bite's design.



O-ring behavior as pressure increases

Deliverables

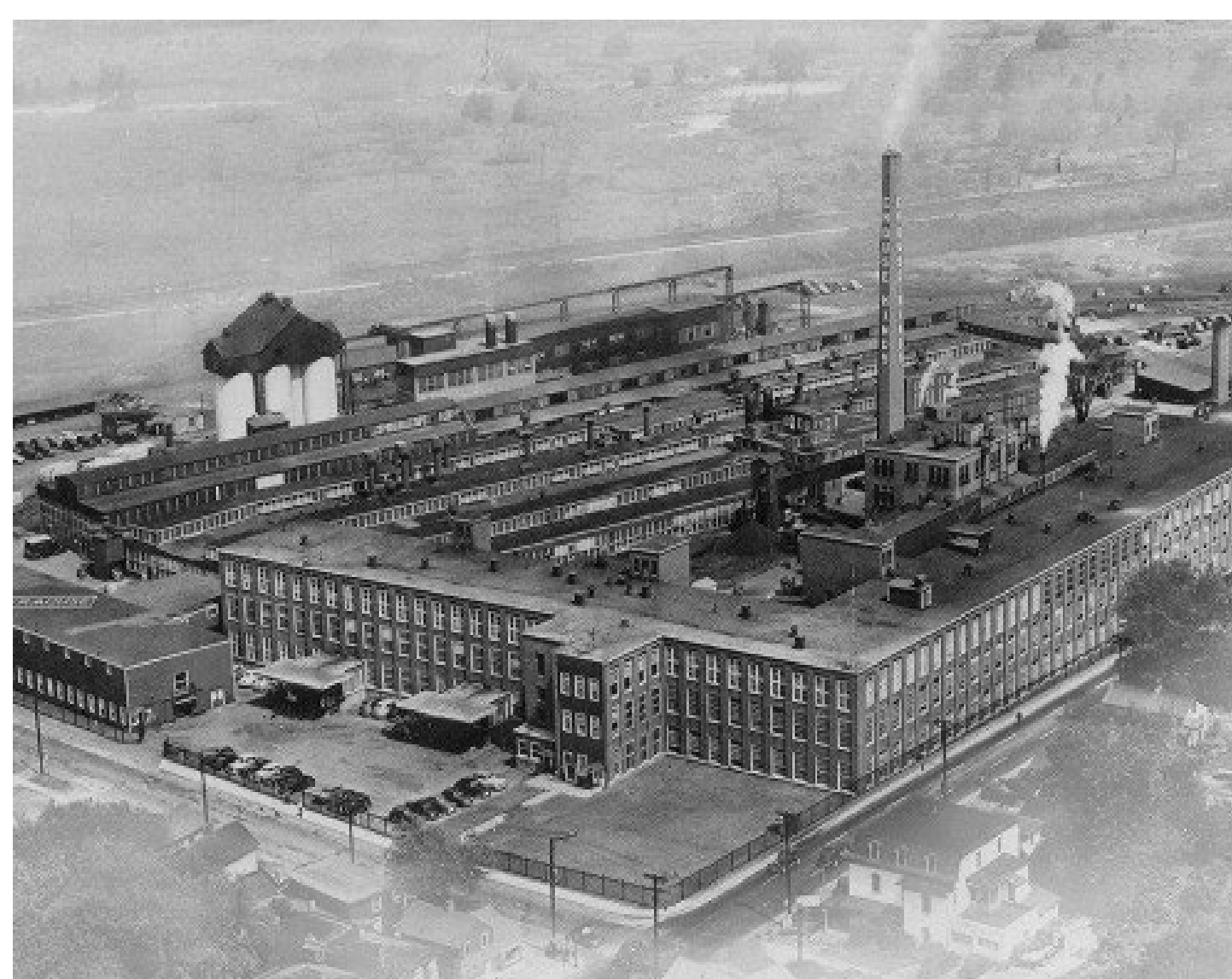
- Meets Class 1 Division 1 and 2 explosion-proof classifications
- Develop a secure and reliable locking mechanism which can be disconnected without breaking the junction
- Ensure the hub can accommodate several fitting sizes and shapes
- Easily replaceable without use of specialized tools and excessive downtime
- A material selection that provides durability, corrosion resistance, and other explosion-proof properties in hazardous environments
- Overpressure tests and simulations to see how the design behaves and deforms under typical operating conditions
- Full compliance with industry standards and certifications to ensure safety



Eaton EYS Explosion-proof Conduit Sealing Fittings

Manufacturing Facility Tour

Eaton is kind enough to offer a tour of their manufacturing facility, Eaton Crouse-Hinds, in Syracuse, New York. We will utilize their local resources for condulet design and prototyping.



Eaton Facility in Syracuse, NY

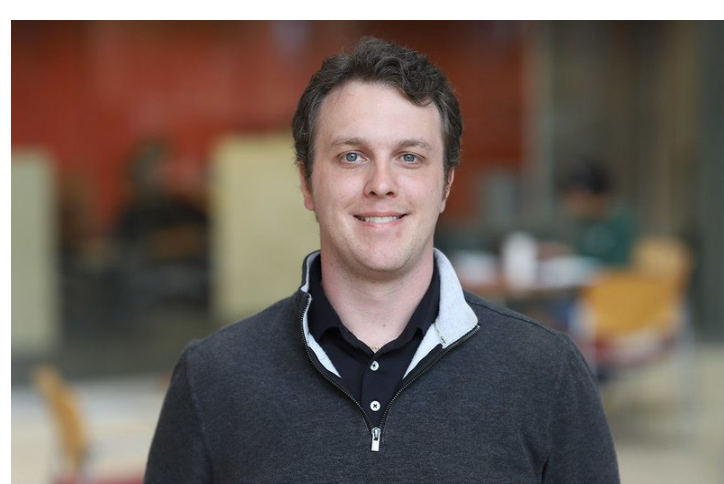
Tools

Research and development will require extensive testing and development using tools such as Finite Element Analysis. ANSYS simulations can determine and analyze the behavior of the conduit as a hub connection deforms it. Simulations will provide insights into design qualities.

Our Team:



Andrea Shen



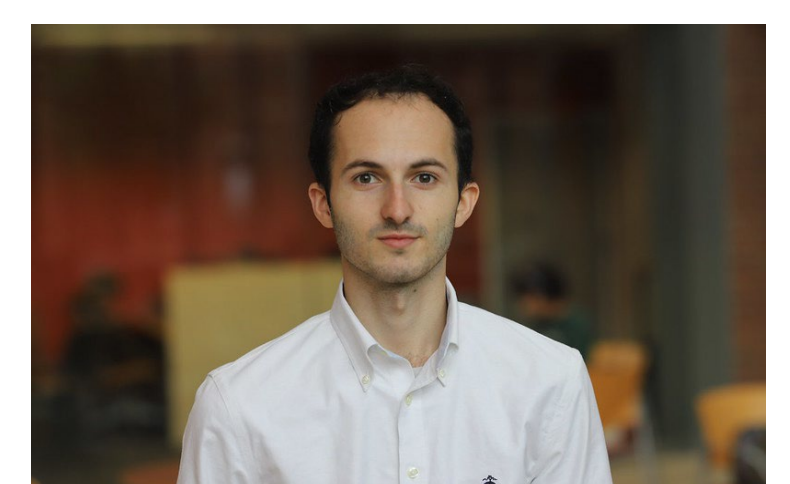
Edward Rowe



Lukas Morris



Micky Wehrle



Stephen Fisher