



## Hydraulic Hose Failures: Causes, Prevention and Best Practices

Hydraulic hoses are the unsung heroes of industrial operations. When the right hose is doing the right job, it keeps machines, vehicles, and workflows running smoothly and without much thought. But when a hose fails, it can bring an entire operation to a screeching halt – or worse. Hose failures can have catastrophic consequences for equipment and crew.

The single best way to mitigate hydraulic hose failure is with knowledge. As a component of a larger machine, it's important for operators to understand what causes hoses to fail and how to improve hose performance, reliability and longevity. We'll look at the most common causes of hose failure, how to select the right hose for the job, the importance of training and best practices for maximizing hose performance.

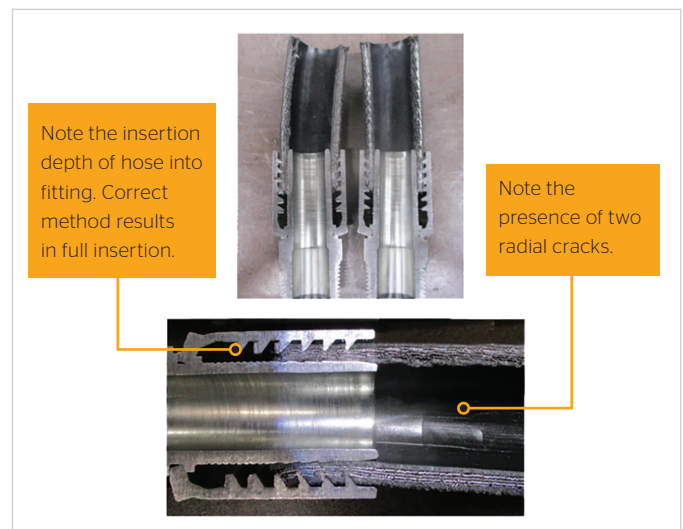
### Why Hoses Fail

Hydraulic hoses, by their very nature, can be dangerous when failures occur. They're often running mineral oil-based fluids, synthetic oils, water-based fluids or other fluids up to 6,000 or 10,000 PSI. If something goes wrong it can be fatal for the operator or those in close proximity.

Hydraulic hoses fail for a number of reasons including abrasion, incorrect hose or fitting sizes, couplings or crimps, mixing and matching fittings and hoses from different brands, lack of education or training by operators and more. To prevent hose failures, it is important to understand failure modes, including what causes them, how to prevent them and best practices to avoid them.

### Assembly Anomaly

To the right is an example of improper assembly. To the naked eye, it may look like the hose was crimped correctly, but once it is cut open, we see the hose is not fully inserted, which caused two radial cracks inside the hose leading to its failure.



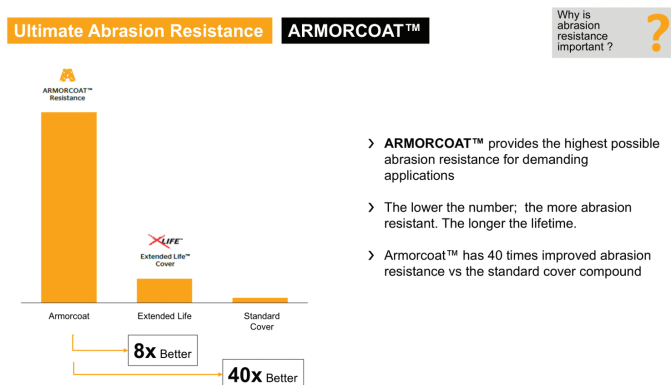
Improper installation or routing can restrict flow of the hydraulic fluid inside the hose, which leads to poor reaction time within the system. It could also lead to premature failure, which could shut down an operation. It is recommended to avoid the following in hose routing: tensile loads, side loads, flattening, thread damage, kinking, damage to seal surfaces, abrasion and twisting or distortion.

## Avoiding Abrasion

One of the biggest reasons for hose failure is abrasion, which can occur when the hose is rubbing on an external component like equipment, another hose or object, or if there is a routing problem that can create friction on the hose.

Using high-pressure hoses with extra abrasion resistance built into the material of the hose can help minimize failure from abrasion. To meet this need, Continental developed the X-Life™ XCP5 hose, a flexible, braided hose for high-pressure hydraulic applications requiring extra abrasion resistance. The X-Life™ XCP5 hose is best for applications that require tight bends and flexibility, including in the agriculture, mining, manufacturing, construction and energy industries. It works in temperatures ranging from -40°F to 212°F. The hose material is impregnated with carboxylate nitrile, a modified nitrile rubber that enhances tensile strength and abrasion resistance while maintaining resistance to oil, solvents and other fluids. To further enhance abrasion resistance, the XCP5 hose can also be ordered with an optional ArmorPlate coating shield, which provides protection from the harshest elements up to 28 times better than a standard cover hose. The coating on the hose also provides extreme corrosion resistance – almost seven times more than the SAE J516 requirement of 144 hours – and delivers 1,000 hours of red rust corrosion resistance.

Continental's Armorcoat™, a high-pressure hydraulic hose designed for applications requiring maximum abrasion resistance and excellent performance in tight bends with petroleum-based and water-based hydraulic fluids, provides the highest possible abrasion resistance for the most demanding applications. In testing, Armorcoat™ showed 40 times improved abrasion resistance versus the standard cover compound.



Similarly, the fittings should be manufactured from a single piece of steel. Continental's B2 fittings are constructed from a single piece of steel without brazed or welded joints to provide ultimate protection against leaks and potential leak paths. Interlocking bite-to-wire technology delivers maximum coupling retention for safer assembly and reliability.

## Careful Crimping

Typical components in a hose setup include the hose and fitting, which are connected by a crimper. Crimping permanently attaches the fitting to the hose by using mechanical pressure to compress the fitting onto the hose. This connection is critically important to the safety and functionality of hydraulic hose systems for a variety of reasons:

- › **Seal integrity:** The crimp connection creates an airtight seal that prevents dangerous high-pressure fluid leaks. High-pressure fluid leaks could result in environmental contamination, equipment damage or serious injury.
- › **Pressure retention:** Hydraulic hoses must have proper crimp connections to operate under extreme pressure consistently and without failure over time
- › **System reliability:** Improper connections are one of the leading causes of system failure, which can lead to costly repairs, downtime and lost productivity
- › **Safety assurance:** A failed hydraulic connection can have disastrous consequences, including high-pressure fluid injection injuries – which can be fatal – or whipping hose injuries. Sending everyone home safely at the end of every day is one of the most compelling reasons to ensure correct connections.
- › **Product lifespan:** Correctly crimped hoses work better and last longer, delivering better ROI and improved performance throughout the life of the hose

It is important to follow crimp specs for a number of reasons. Fittings and hoses are tested in accordance with the industry specifications, such as SAE J517 and ISO 18752. Accelerated destructive tests, such as impulse, leakage and burst, are conducted to confirm the robustness of the hose and fittings. Hose and fitting interfaces are tested according to crimped outside diameter. A minimum of four samples is required to pass the impulse test, which is conducted at specified impulse cycles, rated temperature and test pressure. Continental runs these tests because the polymers of the tube and cover of the hoses become soft after transferring fluids at elevated temperatures. Impulse tests are conducted to ensure the fittings are still retained when the hose assemblies have been transferring fluids at rated temperatures and at pressure surges. Additionally, the polymers of the tube and cover may lose some physical strength after being exposed to the hydraulic fluids at the rated temperature and pressure.

Crimping machines provide the best method to ensure a perfect crimp for every hose every time and are a key tool when it comes to avoiding hose failure. Continental's PC160i crimper, which became available in 2024, takes the guesswork out of hose crimping and ensures a reliable connection with every new hose application. The machine includes a tablet

with CrimpIQ® Pro Mode software that was created with the daily operator in mind. The crimper features automatic, semi-automatic, and manual modes, with tooling capable of handling true 1 ¼" specifications and extending to some 2" applications. This service model has more capacity and more technology than its predecessors and is comparably priced. It is simple to use and intuitive, featuring a "three taps to crimp" format that guides the user through the entire process from start to finish. The technology greatly reduces the chance of human error and increases accuracy of hose crimping. It also reduces potential waste caused by selecting the wrong fitting and hose combination, saves money and time on continued operator training, and improves safety by ensuring an accurate crimp every time. The crimper technology with the tablet interface allows users to track hose failures and educates users to avoid failures in the future.

Continental also offers Shop in a Box, a fully assembled, turnkey hydraulic package in a box ordered under one single part number. With Shop in a Box, users can create a hydraulic and industrial hose crimp shop right inside their current location. The easy-to-use setup contains a crimper – with six crimper options to choose from based on the shop's needs – and all the accessories needed to produce premium assemblies. The simple operation of the touchscreen interface helps the user navigate through specifications, notes and relevant crimping instructions, and the unique hose identification label allows you to track both assembly and operations-related information so the user can record, manage, and retrieve important information. A cloud connectivity platform provides the latest specifications and updates and enables remote maintenance. Preferences, favorites and user settings are saved and securely stored in the cloud and technical support is provided from within the application. Machine performance and maintenance



plans can be easily monitored. This technology enables operators to perform remote maintenance and upload updates for the crimper, saving customers a great deal of time and money. The whole crimping process can be monitored via a securely protected website.

Education and training are key to avoiding hydraulic hose failures. Knowing where to look, how to measure crimp specs, and how to use the crimper are all equally important. To help educate its users, Continental offers support virtually and in-person. The company invites customers into its custom crimp shop for site tours and works with distribution partners to help educate customers and offers customizable training. The website [Contifluidolutions.com](https://www.contifluidolutions.com) offers training and information along with crimp specs and other relevant info for hydraulic hoses.

## Fending Off Hose Failure

Selecting the correct hydraulic hose for the application is critical for worker safety and optimal performance of a hydraulic system. The STAMPED acronym provides a systematic approach that engineers, technicians, and maintenance personnel can use to make sure they are selecting the correct hydraulic hose for the job. Each letter represents a critical factor to consider:

- S** – Size (ID, OD, Length)
- T** – Temperature (Internal, External)
- A** – Application (Current hose being used)
- M** – Material (Conveyed through tube, External)
- P** – Pressure (Working, Vacuum)
- E** – Ends (Fittings, Custom ends)
- D** – Delivery

- › **Size:** This includes the hose's inside diameter (ID), outside diameter (OD), and length. The ID affects flow rate and pressure drop, while OD is important for fitting clearances. Length must accommodate movement and flexibility.
- › **Temperature:** Evaluate both the operating temperature of the media conveyed and the ambient temperature where the hose will function. Hoses must withstand extremes without degrading or failing.
- › **Application:** Understand the specific use case. Will the hose be used in a static or dynamic environment? Will it need to flex repeatedly or remain stationary? Consider vibration, movement, and wear points.
- › **Material:** Identify the substance being conveyed. Is it oil, water, gas, chemicals, or another fluid? Compatibility with the hose material is critical to prevent degradation, swelling, or chemical breakdown.

- › **Pressure:** Know the system's working pressure and potential pressure surges. Hoses must handle both constant and peak pressures safely without rupturing or bulging.
- › **Ends:** Determine the type of fittings or connectors required. Compatibility between hose and fittings ensures secure, leak-free connections.
- › **Delivery:** Consider any additional requirements, such as industry certifications (e.g., SAE, ISO), color-coding, branding, or delivery timelines. This step ensures that all specifications and standards are met before installation.

In addition to using STAMPED, it's recommended to work with an industry expert when it comes to selecting proper hydraulic hoses. If a machine continuously experiences hose failure, it's time to stop using those hose specifications and engage with an expert to revisit proper hose selections. Experts can connect with different teams at the company about hose failures and help evaluate next steps.

Since all hoses are different, lifetimes of hoses are also different. Hoses with articulation will need to change out every three months. Other hoses can last up to a year. The expected life of a hose will be product and industry-specific, so understanding the needs is very important.

## Proven Protocols

When it comes to hydraulic hose safety, following industry best practices can mean the difference between smooth operation and catastrophic failure. Proper selection, installation, and maintenance of hoses and fittings are essential to preventing accidents, reducing downtime and extending equipment life. Seven key considerations can help ensure a safe working environment for those operating equipment with hydraulic hose components.

- › Don't guess when selecting a hydraulic hose or fitting. Guessing can hurt people on the job. Use the STAMPED method and connect with an industry expert to ensure you have the right hose and fittings for the job.
- › Make sure the employees running the equipment know how to make a proper hose connection. Employees put a lot of trust in their employer and fellow employees who are changing out hose connections. Make sure everyone has the proper training and that there are avenues for employees to ask questions.
- › Don't mix and match fittings and hoses from different brands. An easy way to avoid failure is to keep the components in the same brand to make sure the hose goes with the fitting.

- › Follow lay lines, which are typically easy to read with different colors marked right on the hose. This is a safety feature that takes the guesswork out of which hose to use.
- › Use hose tags and labels, which act as a birth certificate for the hose, for traceability. Inputting the installation date in a tracking system can help employees track the life of a hose. This can help determine what was done right with the connection, what could be done differently, and what should be changed.
- › Properly clean the hose assemblies before introducing new materials. Continental's Shop in a Box – a fully assembled, turnkey hydraulic package ordered under one single part number – includes an Ultra Clean unit to clean the fittings and help users get the full lifespan of a hose. With Shop in a Box, users can create a hydraulic and industrial hose crimp shop right inside their current location.
- › Utilize Continental's insertion blocks to help reduce failures from improper assembly. The blocks are a machined piece of metal drilled to the depth that you would put the hose into. It works by taking a piece of hydraulic hose before coupling, inserting it into the block, and drawing a line so you have the exact insertion depth. This helps ensure full insertion. Insertion blocks come with Continental's Shop in a Box and are available for both braided and spiral products.

## Conclusion

Hydraulic hose failure is not just a matter of maintenance – it's a critical safety concern that requires attention to detail, proper training and the right equipment. That's why selecting the right hose isn't optional; it's essential. By understanding the primary causes of failure and implementing best practices, businesses can significantly reduce risks, extend the life of their hoses and improve overall efficiency.

When it comes to hydraulic hose safety, expertise and proactive prevention are key – because in high-pressure environments, there's no room for error. Contact us today at [www.continental-industry.com/en/campaigns/hydraulic-hoses](http://www.continental-industry.com/en/campaigns/hydraulic-hoses) to learn more or to connect with a hose expert.





## Industrial Fluid Solutions

Market segment

Hydraulic Hose

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