CHANCE RIDES, INC.
4219 Irving
Wichita, KS 67277-2328
U.S.A.
Phone: 1-800-242-6231 • FAX: 1-316-942-7416
Website: www.rides.com

Bulletin No: B090R1229-0
Release Date: November 1, 1999
Effective Date: November 1, 1999
Supersedes: N/A
Completion Date: N/A

SERVICE BULLETIN

Ride Manufacturer: CHANCE RIDES, INC.
Affected Production Dates: All

Ride Name: ALL RIDES
Affected Serial Nos.: All units

Model No.: All

Abstract of Issue:
Hydraulic Hose Installation, Inspection and Maintenance

Reason For Release:

Chance Rides, Inc. utilizes hydraulic hoses in the design of all hydraulic systems. The material, size, length and configuration of each hose is carefully selected based on a number of factors. These factors include, but are not limited to, location, function, operating pressure and capacity.

Improperly installed hoses, or installation of the wrong hose can cause failure of the hose, resulting in leakage, rupture, or contamination of the hydraulic system. These types of failure can cause malfunction of the equipment or fire, and can result in serious personal injury.

Action to be Taken:

Replacement hoses are available from Chance Rides, Inc. If replacement hoses are procured from another source, the new hose must meet all specifications of the original hose. When a hose is removed, it must be routed in such a manner that the new hose is kept away from moving parts and electrical connections. Hoses must be inspected regularly and maintained to keep them in good condition. This bulletin provides guidelines on specific causes of hose failure. These guidelines must be considered as part of an overall inspection and maintenance process.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

Use only those components authorized, specified or provided by Chance Rides, Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.

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Detail Of Issue

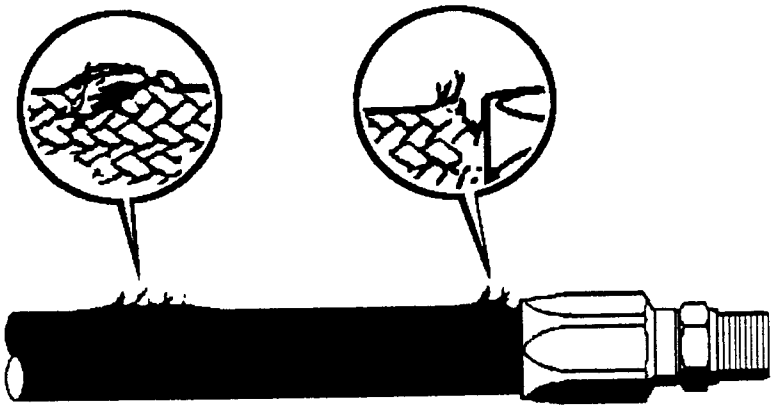
The following are common causes of hydraulic hose failure:

1. Improper pressure range
2. Excessive temperature (internal or external)
3. Fluid compatibility
4. Improper hose size - internal diameter
5. Improper hose length
6. Exceeding minimum bend radius
7. Hose / fittings mismatch
8. Improper alignment
9. Excessive abrasion
10. Improper use

1. Pressure Rating

Hoses must never be subjected to pressure greater than their rated working pressure. When the working pressure is exceeded, the safety factor is reduced, resulting in greatly shortened service life and premature failure, such as hose rupture or even "blow-offs" (separation of the hose from its end fitting). Premature failure increases operating costs through frequent replacement and increased down-time.

Hydraulic systems often experience momentary increases in pressure (surges and shocks) which are too short in duration to actuate the relief valve. When these pressure pulses are high enough and occur often enough, they exert excessive stress on the hose and reduce its life. Pressure peaks can cause failure in the hose, or at a fitting. When excessive pressure surges can be anticipated, a hose with a higher pressure rating must be selected.



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Detail Of Issue (continued):

2. Temperature Rating

Temperature extremes, both internal and external, are major contributors to early hose failure. Hoses which are continuously exposed to heating/cooling cycles will experience accelerated deterioration. When these cycles occur in conjunction with repeated pressure surges, hose service life is drastically shortened.

Hoses can become embrittled through exposure to exterior temperatures of several hundred degrees. This condition can be created by improper routing of the hose (e.g., where a hose is located near a manifold or other hot area). In such cases, the hose must be re-routed or shielded from the heat source.

3. Fluid Compatibility

Another major consideration in the proper selection of hoses is fluid compatibility. The performance characteristics of any specific hose material must be compatible with the fluid which it will contact in service. Incompatible fluids will affect the hose liner. It may become embrittled, softened, dissolved, shrunken or swollen. These conditions can cause leakage at or away from the fittings, or blow-offs. Solid particles from deteriorating hoses can clog valves and filters.

4. Size

If the internal diameter of the hose is too small to handle the full flow demanded by the system, flow is restricted by friction. Friction results in heat, both in the hose and the fluid. Heat leads to reduced hose life.

5. Length

In any hose installation, allow some extra length in the hose for slack. Pressure changes can cause a hose to lengthen by up to 2% or to shorten by as much as 4%. For example, a 100-inch hose can contract to 96 inches. If the hose has no slack, it will tend to pull away from the end fitting and will be damaged.

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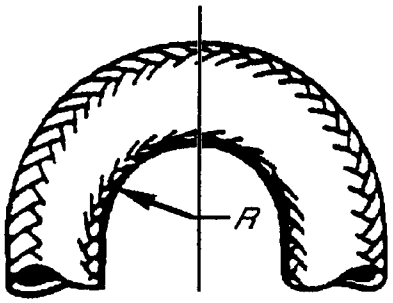
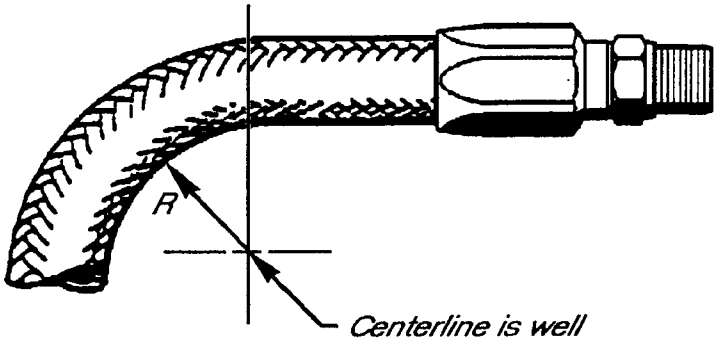
Detail Of Issue (continued):

6. Exceeding the bend radius

A bend radius that is too tight will result in reduced hose life. When a rubber hose exceeds its minimum bend radius the outside may appear smooth even if the inner tube is kinked. It is important to measure the bend radius as shown below to check that it is in the specified limits for that hose. Check with the supplier of the hose for its minimum bend radius.



Bend is too small



Centerline is well away from fitting

When a bend radius is too tight, immediately re-route the hose or use different adapters to correct the condition.

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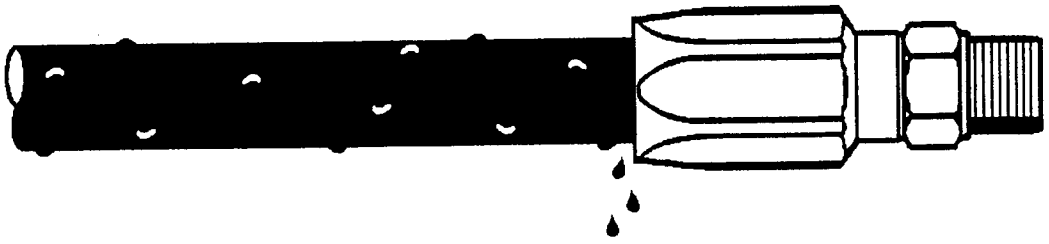
Detail Of Issue (continued):

7. Hose / Fitting Mismatch

When a hose blows away from a fitting, the can often be traced to either a mismatch where the wrong hose end fitting was selected for a particular hose or the fitting was incorrectly installed.

A typical hose/fitting mismatch is one in which the wall thickness of the hose is too large for the fitting. The fitting will not seat completely onto the hose without damaging one or both parts. This can cut the hose liner and result in leakage or blow-off.

Similarly, when a low pressure hose is installed onto a high pressure fitting, the hose wall is to thin to be gripped adequately. The hose will either blow-off or leak. Also, bubbling of the hose cover and leakage at the fitting are common.



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Detail Of Issue (continued):

8. Improper Alignment

As hoses are routed and fittings tightened, the hose can become twisted. This condition must be avoided. A 7% twist in a hose can reduce its life by as much as 90%. Also, a twisted hose under pressure tends to "un-twist". This can cause the end fitting to loosen from its connection.

Hoses usually have a line printed on the outside as shown, called the "lay line". The lay line is useful as a point of reference in detecting twists in the hose. Keep the lay line straight as the hose is installed and fittings are tightened.

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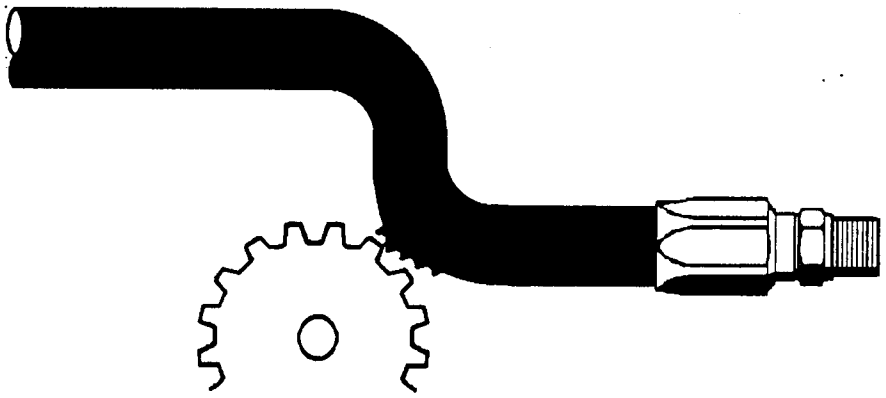
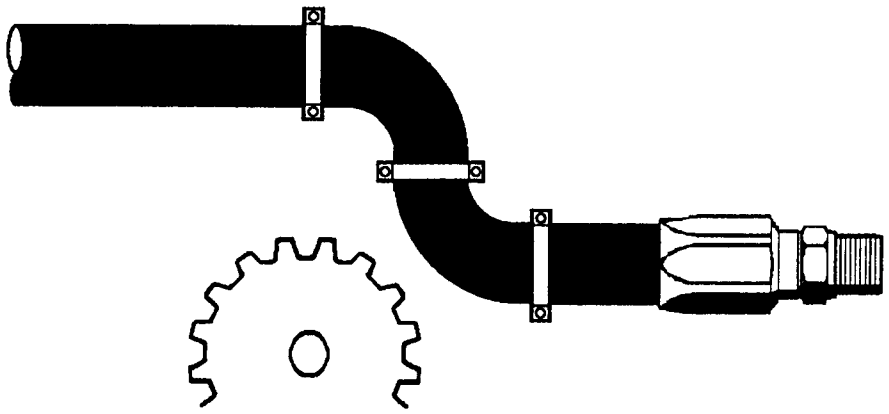
Detail Of Issue (continued):

9. Abrasion

Route hoses to avoid rubbing or abrasion between hoses, or between hoses and other components. While relative motion caused by moving parts is obvious, do not overlook motion created by vibration.



When a hose must be routed through tight areas or near moving parts, use clamps to secure the hose. Clamping helps keep hoses away from adjacent components. Do not exceed bend radius recommendations



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10. Improper Use

Treat hydraulic hoses with care. Although not delicate improper handling and use will severely shorten their life. Do not stand on hoses or hang onto them when working on the equipment. Do not drive over or set heavy objects on top of hoses. Do not force or pull on hoses as they are installed. Keep sharp tools and other objects clear of hoses.