

This manual is designed to provide information for you to understand, use, maintain, and service your trailer running gear system. Your axles are manufactured by Dexter Axle. Since 1960, Dexter's experience in the design, testing, and manufacturing of trailer axles has resulted in the most complete product line in the industry. The Dexter running gear system consists of axles, suspensions, and braking systems which are engineered to provide you the finest towing and stopping performance available today.

Two Dexter philosophies are at work to provide you the best product available and have enabled us to maintain our position of leadership. First, we operate on the theory that "there is always a better way" for a product to operate, to be manufactured, and/or to be serviced. We are constantly striving to find that better way.

Secondly, we maintain wall-to-wall production control so that all the major components of your running gear system are manufactured in Dexter facilities under our strict quality control standards. These manufactured components include axle beams, hubs, drums, spindles, and braking systems, as well as the components used in the attachment of the axle to the chassis. Dexter has the most complete, state-of-the-art manufacturing facilities which enable us to provide you, the trailer owner, with the finest product possible.

Visit us online at www.dexteraxle.com.

Important Safety Notice

Appropriate service methods and repair procedures are essential for the safe, reliable operation of all running gear as well as the personal safety of the individual doing the work. This manual provides general directions for performing service and repair work with tested, effective techniques. Following these guidelines will help assure reliability.

There are numerous variations in procedures, techniques, tools, parts for servicing axles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this manual must first establish that they neither compromise their personal safety nor the vehicle integrity by their choice of methods, tools, or parts.

Refer to your vehicle manufacturer's owners manual for additional procedures, techniques, and warnings prior to performing any maintenance or repairs.

CAUTION

This is the safety alert symbol. It is used to alert you to potential injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Installation

To assure safe operation and maximum durability of parts such as brake linings and tires, it is necessary to position and install the axle properly. It is recommended that the axle assembly be installed so that camshafts rotate in the same direction as the wheels. Installation in which the camshaft rotation is opposite that of wheel rotation could cause noisy brakes, chatter, and wheel "hop". With this thought in mind, the axle should be ordered with placement of air chamber and slack adjuster assemblies that will ensure the correct directional rotation of the camshafts when the axle is installed.

It is the responsibility of the axle installer to adjust the brakes properly. The recommended adjustment procedure is covered in the section pertaining to brakes.

Responsibility for proper axle alignment lies with the axle installer. The axle must be installed so that it will be parallel to the drive axle(s) of the tractor. This will allow good vehicle control when cornering, longer tire wear, and it will eliminate dog tracking. Alignment can be determined by measuring from the center of the trailer king pin to the center of each end of the axles. The difference should not vary by more than $\frac{1}{16}$ ". In the case of multiple axles, the axles must also be in line with each other. The difference between the centers of one axle and the centers of the other axle must not vary more than $\frac{1}{8}$ ".

Dexter tubular axles are made of high strength steel for better fatigue life and superior welding qualities. The round tubular axles provide a uniform section modulus no matter how the beam is rotated.

Brake spiders are positioned and welded to exacting specification requirements at our factory. Ring welding the spider directly to the axle beam provides a higher strength and more reliable brake attachment over bolt-on versions.

In welding suspension component parts to a Dexter trailer axle, extreme care must be exercised to obtain correct location and ensure the spring seat load bearing surfaces are parallel to each other.

Axle Beam Repair Welding

In the interest of safety and preserving the service life of trailer axle assemblies, Dexter recommends that trailer axle beams NOT be repair welded. Repair welding can detract from the structural integrity of an engineered component, particularly on heat-treated parts where the benefit of the processing may be nullified by the welding. Therefore, a new replacement beam should be installed as soon as possible.

Preheating Recommendations

Absolutely no welding should be done on axles that are below 50°F. Before welding on suspension components or any other part onto the axle, the area (within 3") of the attachment point should be warmed slowly to between 500-600°F. Immediately after checking the temperature with an appropriate temperature sensitive crayon, the part(s) should be tack welded in place. Recheck the temperature and if below 475°F, reheat to 500-600°F and complete welding per welding instructions.

Affects of Welding on Axle Beam Material

All welds made on the beam create, in effect, an extremely localized heat-treatment of the metal. The heat generated during the welding process can cause the material in the HAZ (heat affected zone) to become hardened or brittle. This effect can impart an undesirable characteristic to the normally ductile structure. This small hardened area becomes the weakest part of the beam and therefore is the area most susceptible to failure. The axle beam is no stronger than its weakest section. As evident from the sketch on the next page, the welds should be horizontal and as near as possible to the front and rear horizontal

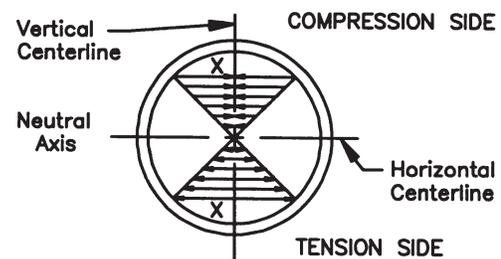
center line of the axle beam. Always avoid welds that are circumferential in nature below the horizontal center line.

Welding Guide

Dexter supplies axles to customers in all stages of assembly from the beam with spindles only, to the complete axle assemblies. In the final analysis and with few exceptions, we have little or no control over later assembly of incomplete units by the trailer fabricator and, therefore, we can not be responsible for warranty on improperly processed components.

Stress of Axle Beams

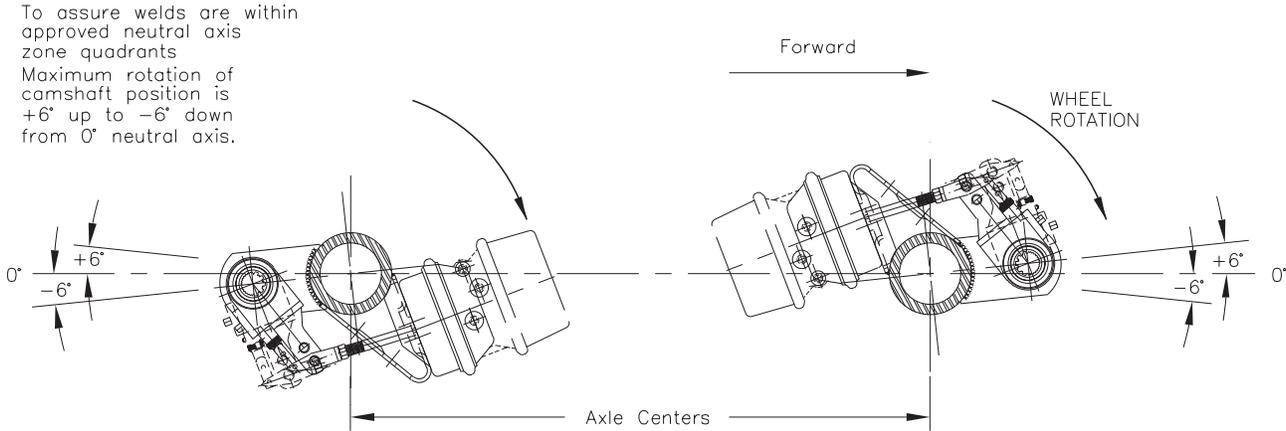
The main loaded stresses on a beam are expressed as three primary stress zones. The compression stress zone (top side), the tension stress zone (bottom side), and the neutral stress zone (front and rear horizontal center line commonly referred to as the neutral axis).



The above is a graphic representation of the degrees of stress in the wall of the tube when the beam is under load. The length of the arrows "X" represents the amount of stress at a given point. From this illustration, it is evident that the two opposite stresses diminish as the horizontal center line of the beam is approached.

In addition, the torsional stress imparted by braking action of the wheels is taken into consideration in rating the axle capacity. An allowance of both stresses bending (beam load) and torsional are factored into the calculations to provide an acceptable design factor. The stresses are reapplied and reversed many times during normal axle beam life. For this reason, the beam material must have certain properties such as impact strength, that permit it to absorb shock, to flex, and then to resume its original and normal "as manufactured" condition.

When welding, it is necessary to avoid the high stress areas on the tube top side (compression zone) and tube bottom side (tension zone). All welds should be made as close to the horizontal center line as possible. When the axle tube is



MOST COMMON FOR OVER-THE-HIGHWAY OPERATIONS.

subjected to the heat from welding and then rapid cooling, the material adjacent to the weld loses its desirable ductile properties and becomes brittle. If this condition exists in the high stress areas under maximum load conditions, the life of the axle will be greatly reduced and premature fatigue failure can occur. Recommended locations for the welds are shown below.

Spring Seat Placement and Location

One of the most critical and important phases of vehicle fabrication is the placement, location, and attachment of spring seats on the axle.

“Overhang” is defined as axle track minus spring center dimension divided by two:

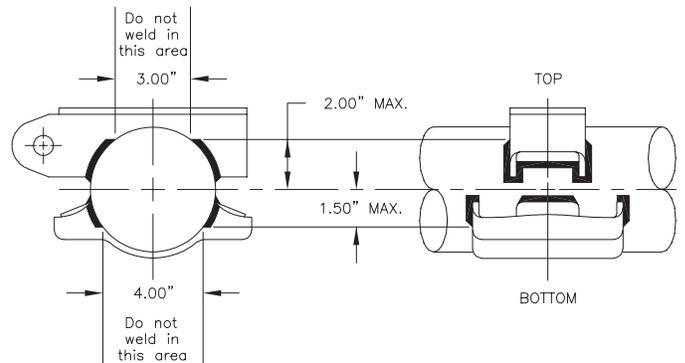
$$\frac{T - S.C.}{2}$$

The maximum spring center is calculated such that recommended inside of tire or drum clearance to vehicle frame is achieved.

Permanent deformation and/or premature failure of the axle may result if the spring centers are too narrow.

Weld Placement Recommendation for Welding Spring Seats to Round Axles

Note: If spring seat and related U-bolt clamp parts are different than shown, refer or consult with suspension manufacturer for weld recommendations.



The welding rods should conform to AWS (American Welding Society), grade E-7018 (Oven-Dried) or comparable. Recommended rod size is 5/32" at voltage and amperage recommended by the electrode manufacturer. For maximum strength, a three-pass weld should be used. The arc should not be broken at the end of each pass and the corners should be wrapped. The electrode should be backed up to fill in the crater at the end of each pass. If the arc is broken between passes, thoroughly clean the weld between each pass.

General Welding Recommendations



Process	Electrode
Shielded metal-arc welding of carbon and low alloy steels.	A.W.S.* E70XX
Gas metal-arc welding of carbon and low alloy steels.	A.W.S.* ER70S-X
Submerged arc welding of mild and low alloy steels.	A.W.S.* F-72-XXXXX

*American Welding Society

CAUTION

Do not bring axles in from non-heated storage and weld while cold. Do not "test the arc" on the axle beam.

Fillets up to 1/2" can be used. Maximum gap .030 inch. The attachments should fit-up as close to the beam as possible to avoid excessive welding. Electrical grounding to the axle for welding purposes, should be done on one of the attachments such as the air chamber bracket, cam support, or brake spider. Connections should be clean and tight. Loose or dirty connections will cause arcing at that point during welding. These small arced areas can create the potential for failure in highly stressed structures. Therefore, grounding should never be done directly on the axle tube. Never attach the ground to an area that would allow the ground path to pass through the spindles, bearings, hub, or wheel components.

CAUTION

To provide optimum suspension-to-tube welds, preheating is recommended. Preheating will minimize loss of the ductile properties in the weld area by slowing the rate of cooling, thus reducing the formation of an untempered martensitic grain structure adjacent to the weld. Martensite, a brittle grain structure, is formed by the rapid cooling of the metal surrounding the weld area. Preheat the suspension seat weld area to 500-600°F prior to welding. Preheated temperature should be verified with a temperature sensitive crayon or appropriate means.

The above welding recommendation pertains to all Dexter Axle Company axle beams. Unapproved variation from the procedures listed will void the axle warranty and could result in an unsafe weld.