

DIAGNOSING AND CORRECTING ASSEMBLY PROBLEMS

Floor crown

This photo shows floor crown that can happen when the weight of a roof structure and sidewalls bears down on the perimeter of a typical transverse floor joist structure. The joists are effectively cantilevered about 30" from the chassis support rails and bend accordingly. This effect will run all along the length of the home sections and be pronounced at ridge support posts. This condition will be framed or blocked into an installation if corrective measures are not taken. The home must be correctly supported along the perimeter and marriage (roof support) at one correct bottom of floor elevation and the chassis (floor support) must be at an elevation equal to the bottom of floor elevation less the height value of the chassis. When a home with floor crown is leveled this way, the chassis will often rest free above the chassis piers for some time as it relaxes. A final pier tightening may be necessary after an adequate relaxing period.



Floor crown affecting roof closure

With the chassis piers installed to their correct elevation and the sidewalls not yet properly leveled to bottom of floor elevation, this home has a substantial gap at the roof. Since this home sat in storage during the damp winter, the floor crowned as roof structure weight bent the floor joists where they cantilever over the chassis. The sagging sidewalls pull the roof apart to some extent and must be properly leveled before shimming and bolting the roof. If corrections are not first made to the sidewall elevations, the home will be framed or blocked in a deformed manner with sidewalls sagging about 1/2". Properly support the sidewall to correct elevation and the gap will diminish partially, then shim and bolt in accordance with manufacturer's installations.



The water level set to bottom of floor elevation (equal to chassis elevation + chassis height) confirms that the sidewall is sagging since the chassis piers are set to chassis elevation.



A carpenter's level at the sidewalls confirms the sagging sidewalls at about 2% slope or about 1/2" from the chassis to the sidewall.



In this case, the framing will be installed by a different contractor and the perimeter must be raised to correct elevation and supported with temporary posts until framing is built. The roof is then shimmed and bolted, thus ensuring that when the perimeter foundation wall is built, it can be set to correct elevation. I strongly prefer to place pre framed walls during the home assembly to help correct these issues before they become problematic. When the perimeter is raised to correct elevation, the chassis may be lifted above the correct chassis elevation but it should relax back over a short period of time and the floor crown will be reduced to an insignificant amount.



CHASSIS CAMBER

Here is a standard I beam chassis for a transverse wood floor joist system. The factory builds them upside down, bends them with beads of weld to create spring support and then attaches the home floor system to them.



The chassis builder applies beads of weld to the chassis on top of the chassis between the axles and the rear end which bends the frame up to support the tail end load. They apply beads to the bottom of the chassis between the axles and the hitch end to cause the frame to arch up in that area to support the load. It takes some experience and guess work to have this come out acceptably. It cannot always be exact or correct since it depends on how long the unit is stored unsupported, how far it is shipped and how many bad bumps it takes in transit. At times, there is too much camber or arch and the unit may remain uneven in elevation during and after installation. If it is too bad to leave as is, it can be corrected with welding beads opposite the excessive bend or cut and spliced. Usually occupants do not complain of minor elevation issues caused by excessive camber.

Note the camber built into this chassis. While there is a joint in the beam, the bend is designed to provide spring support to the home structure until it is supported on a foundation.



Here a bead of weld is set between the axles and hitch to camber the chassis up here and resist sagging. The chassis on the right needed more or has been stored unsupported too long.



This chassis is over cambered at the axles so the bent chassis is resting above correct elevation. The weight of the home and roof may help this home settle some, however if it is too much it may need to be relief cut or weld beads added to the bottom of the apex to straighten the bend. I prefer to leave the chassis piers at correct elevation for a week or two if time permits and let the home relax if it will. If it will not and is tolerable to the occupants, the chassis piers and perimeter framing should be raised to the chassis and bottom of floor as needed and it will remain cambered a tolerable amount.



Note the gap between the piers and the pier nuts. This may settle out partially.



This home had so much chassis camber, the rear end wall was 2 1/2" above grade. To correct the problem, the chassis was lowered so the perimeter wall and marriage piers were the only remaining support. This rail was then unbolted, lowered, cut to relax, straightened and re welded, then the chassis was restored to proper elevation, fastened and blocked. This is an extreme case but it needed extreme measures to allow the home to be assembled.



This home has been sitting for a year and the chassis camber has lost its spring and relaxed. The sag will jack out, but the sheetrock is likely cracked, mildewed, and the floors crowned badly from sitting unsupported. It is also common for rain water to run down the plastic close-up and into the under-floor rodent barrier where the extreme humidity can buckle the floor decking and push partition walls, doors and cabinets out of level. I usually insist that the home is not ordered until the permits are issued and the foundation footings are dug. Having a home sit in storage too long is a bad practice. If I get a call to install a storage rat like this I will pass on it. There is no way to have a satisfied customer with a messed up home and the installer will likely have to defend his installation work when the complaints come.



DEALING WITH MISSALIGNMENTS AND SERVICE

Despite the great advancements in the manufactured home construction; walls, ceilings and roof decks are often slightly misaligned, eaves are often different lengths and sometimes the units are different lengths when they were supposed to be the same. If exterior doors and windows are not properly square and the home and foundation are level where they occur, you can defer the issue to the manufacturer for service, which will leave you out of the liability loop. It may work well to provide the needed service to the dealership or homeowner, but keep in mind the long term liability that comes with the service. Manufacturer may explain that it was level when it was built, but the way the manufacturers level the sections for construction is nowhere near as level as it will be when properly water leveled and placed on true level framing. Send a copy to the factory service department, the dealer service department and the owner. Keep a copy for your records.

This mismatch was trimmed and sealed up to prevent damage until the factory service could arrive and correct the eave.



Here an eave was built where trusses should be placed on this truss on site center section; it had to be cut off.



This matting line wall was misaligned significantly. One problem is the tie down straps from the floor through the wall posts to the ridge beam that must remain intact.



Here is a bowed floor joist from a wood joist system. Often the floor joists will bow between spans, especially if they absorbed moisture from under the home causing the deck to bow and bend a floor joist. This is not because of pier supports being out of level. Floor joists can be corrected by using a strong back brace(a length of lumber running along the floor line between the chassis rails and bolted to each in an attempt to tie them to a common elevation), an approved cut and sister joist splice or replacement, which requires taking up decking.



A combination of thick carpet and pad will often cause doors to drag the carpet. The simple time tested solution is to pop the door hinge pins, draw a straight line and trim the door. Generally 1/4" to 3/8" is about right. The saw should be used in the direction that allows it to be fully supported by the door. Drive the saw slowly and accurately for a straight splinter free line. If the doors are out of square or need a re hang adjustment, do that also. Take care to protect the door from dirty hands and damage. This saw and saw horses had masking tape applied to their surfaces.

