TECHNICAL BULLETIN

Chassis Design Recommendations

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SETTING THE STANDARD
In caravan and trailer suspension and couplings

This Technical Bulletin contains important information regarding the installation of CRUISEMASTER® suspension. Please ensure that it is communicated to the relevant people in your organization.

Shock absorbers not only provide damping and control of the suspension arm and wheel, but are essential in keeping the suspension system intact. Losing a shock and possibly a coil spring may not be a mission stopping event, as the suspension is designed to get you home in "limp mode". However, it will slow you down and probably cost a bit in repairs, especially if there is extensive chassis damage involved. For trouble free service from CRUISEMASTER® independent suspension, it is important that the top shock absorber mounts are securely attached to the chassis.

Figure 1: Chassis rail damage due to shock absorber outrigger being pulled off

The Problem

Trailer builders often underestimate the loads imposed by shock absorbers on the surrounding support structure, usually resulting in a gaping hole where the bracket was pulled off the RHS section. Shock absorbers impose significant cyclic loading, especially in off-road conditions where the load increases proportionally to the velocity of the shock. Most shock absorbers are valved such that the reaction (force) in rebound is higher than in bump, meaning they ***pull*** harder than ***push*** on their mounting brackets.

Incorrect design or installation may lead to high stress concentrations which in turn could lead to premature failure. The FEA image below shows where these high stress areas are located within the chassis structure of the trailer/van.

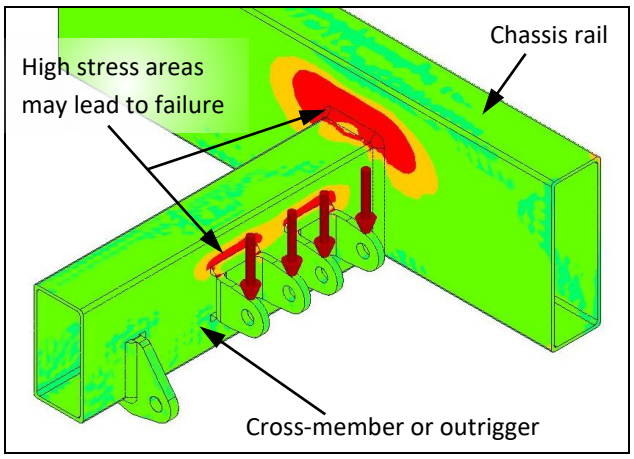

Figure 2: High stress areas (red) in chassis rail and cross-member

Shock Absorber Mounting Brackets

Unless the cross-member or outrigger has a wall thickness of 5mm or more, the top shock absorber brackets should be supported by a reinforcement plate which is the full height of the RHS section, at least 6mm in thickness and welded fully all round, as shown in Figure 3 below. The shock bracket itself should only be welded top and bottom, like the ones on the CRUISEMASTER® suspension arms.

Cross-Members

The cross- or cantilevered member which supports the top shock absorber brackets is usually welded to the inside walls of the chassis rails. Here we recommended that the member is the same height as the chassis rail, at least 3mm in wall thickness, a suitable section size to carry the loads imposed in it and is welded all round, as shown in Figure 3 below.

Fitting a gusset behind the cross member will further help to support the shocks and react the load from the shock absorbers

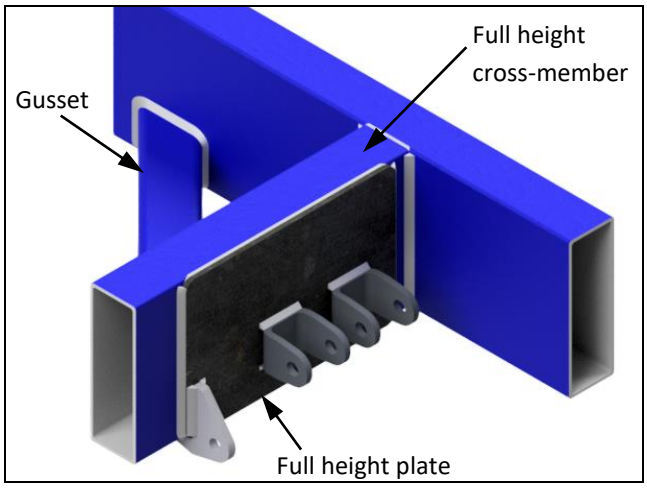

Figure 3: Recommended installation

If the cross- or cantilevered member is a smaller section than the chassis rail, it is recommended to reinforce the chassis rail with a full height plate or RHS section on top of the cross member, bringing it up to full height, as shown in Figures 4 and 5 below.

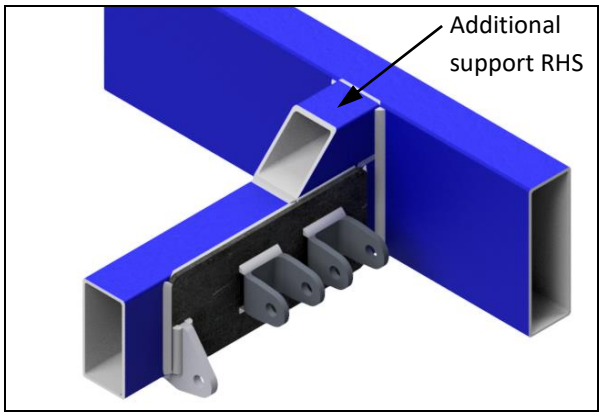

Figure 4: Alternative to full height cross-member

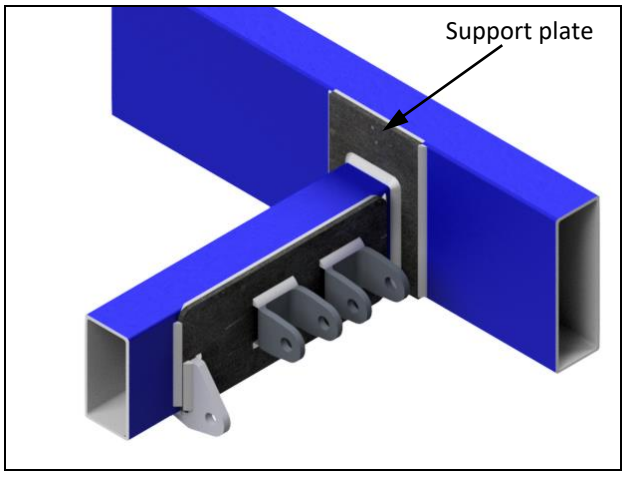

Figure 5: Support plate between cross-member and chassis rail

For further information and drawing detail, please consult the CRUISEMASTER® installation documentation supplied with each suspension kit, or give us a call if you have any specific queries.