

Background

The Technical Committee has observed failures of SFI Spec 3.3 arm restraints in multiple incidents over the past several years. This has prompted a rule modification to minimize these failures at our LSR venues by addressing the potential causes of those observations. **Note: this change in the rule is NOT manufacture specific.**

The New/Modified Rule:

Here is the wording of the modified rule changes are in **BOLD/CAPITALIZED**:

...SFI specification 3.3 arm restraints with a manufacture date of 2006 or later are required in all vehicles. **IN ADDITION: ALL ARM RESTRAINT HARDWARE MUST BE OF A SINGLE PIECE MANUFACTURE. I.E. NO TWO PIECE OR WELDED "D" RING STYLE ADJUSTERS. ADJUSTABLE TETHERS SHOULD USE A 3-BAR SYSTEM SIMILAR TO THAT USED IN LAP BELT ADJUSTERS. NON-SEWN IN RESTRAINTS SHALL HAVE A TIGHT FIT AROUND THE NARROWEST PART OF THE ARM. ALL ARM RESTRAINTS MUST BE DEMONSTRATED TO BE EFFECTIVE.**

The Problem(s) and Solution(s):

The problems that we are addressing with this modification fall into two categories.

1. The first being a mechanical failure of the "welded" "D" ring(s) when being used as an adjuster in the restraint. Our solution for this failure is to disallow the use of Welded or non-one-piece D rings unless they are being used as an attachment ONLY point. Please note that we have not observed failures in the D rings (two) when they are being used only as an attachment ONLY point. An example would be the sewn-in D rings in a fire suit that are being used ONLY as an attachment point.

Discussion: *The welded/non-one piece D-rings are failing (pulling apart) when used as an "adjuster". We have not observed failures when used as an attachment point only (think sewn into the suit).. hence the convoluted wording that is trying to allow one-piece D rings in certain applications... i.e. as an attachment only point OR backed up by a three-bar adjuster... see attached photo...*

2. The second common failure with the D rings is they are "un-adjusting" during multiple impacts. The solution is to eliminate the D rings when being used as an adjuster and replace with a Three Bar adjuster. I.E. the elimination of D rings for any adjuster application.

Discussion: *The welded D rings are essentially made from wire.. i.e. round... and with multiple high G pulls as in a roll-over(s) "slip" to the point of rendering the adjustment useless. We have not observed this with the one-piece D rings as they are manufactured from "stamped" flat stock with edges and do not appear to "slip" like the round or wire stock welded D rings do. That said I would NOT disallow the three bar "sliding" adjuster as shown in the photo below, as I have not seen any problems as we have discussed so far... however you could ask for a non-slider type three bar to back it up....*

I have also talked with Carl Olsen and Mike Hurst at SFI and will be working with them based on our experiences. I will keep you all in the loop on that as well.

Examples:

Below are some photographic examples of both acceptable and un-acceptable arm restraints. These are photos of the latest "Failures"... again not manufacture specific... type specific...





This type of arm restraint has a single welded ring for belt attachment (not adjusting) with 3 bar length adjuster the attachment at the cuff is a multi-piece swiveling “quick connect” that’s held together with a single rivet ... this meets the letter of the new rule and conversations with SFI about test results were positive



Compliant Arm Restraints



Compliant "Suit" arm restraint



Another example of a “compliant” arm restraint – has outer square ring with sliding adjustment bar – no D rings present

