Ford Evaluation of the Tuson Sway Control Module
Instrumented Testing Conducted using
SAE J2664 - Trailer Sway Response Test Procedure

OBJECTIVES OF THE TESTING

There were three testing objectives:

1) to verify that the Tuson Trailer Sway Control Module (TSCM) is compatible with and does not interfere with the Ford Trailer Sway Control System (FTSC) during trailer sway conditions,
2) to determine if the TSCM can provide trailer sway control that meets the sway damping criteria of SAE J2807, on an improperly loaded trailer (with zero sway damping at approx. 65 mph),
3) to determine if the TSCM can provide a sufficient level of trailer sway control that prevents the FTSC from activating under conditions described in #2.

BRIEF DESCRIPTION OF THE TESTING

The testing was conducted at the Ford Worldwide Proving Grounds in Dearborn, Michigan during the week of October 6th, 2014.

The tow-vehicle was a 2013 Ford F150 equipped with FTSC. The test trailer was a Wells Cargo enclosed tandem-axle trailer with electric drum brakes, loaded to 6,000 lbs. The trailer weight was distributed improperly to create the trailer sway condition described in #2 (above).

There were four (4) series of test runs in which trailer sway data was collected for comparison. In each series of tests, the trailer was driven at multiple speeds and the sway was initiated with a "pulse" steering input using the SAE J2664 procedure. The improper loading of the test trailer was not per the SAE J2807 loading procedure. This departure from J2807 was done to create a trailer that would not meet the J2807 requirements to see if the TSCM would then make the trailer meet the J2807 sway damping requirement. Therefore any test results reporting that the sway damping criteria of SAE J2807 was not met do not indicate a poorly functioning or unsafe tow vehicle and/or trailer, but merely means that improperly loading a trailer can lead to low levels of sway damping.

TESTING RESULTS

A brief summary of the test results is as follows:

1) The first series of test runs was with the *FTSC active* and the *TSCM inactive*. The trailer sway was sufficient to activate the FTSC system. The FTSC controlled and prevented the trailer sway from increasing however; the level of sway damping (0.02 at 100 km/h) was not high enough to meet the sway damping requirement specified in SAE J2807 (> 0.10 at 100 km/h). There were some runs with higher damping when the FTSC activated more strongly, but the reduction in vehicle speed was too great to be considered a good run according to the J2664 procedure.

2) The second series of test runs was with the ***FTSC active*** and the ***TSCM active***. The trailer sway was sufficient to activate both the FTSC and the TSCM although the TSCM started working before the FTSC. The sway damping was improved over the first condition and was high enough (0.102 at 100 km/h) to just meet the J2807 sway damping requirement.

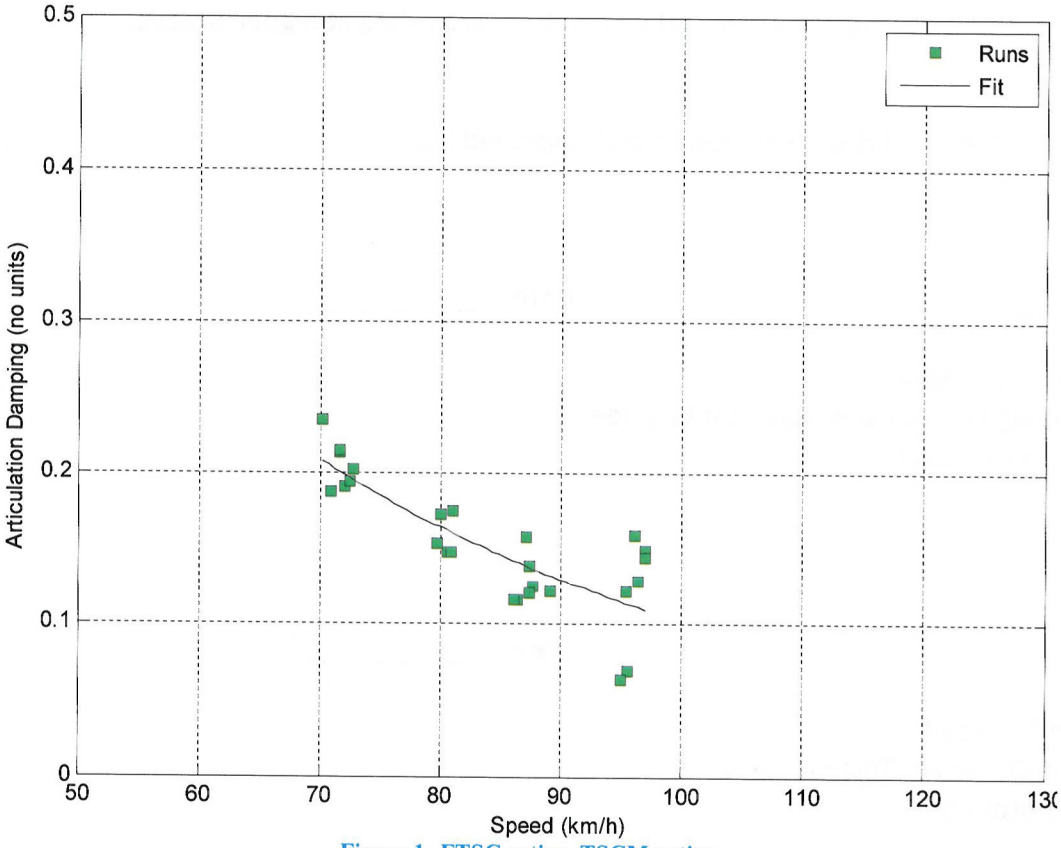

Figure 1- FTSC active, TSCM active

After reviewing the data from the second series, a decision was made to lower the sway activation threshold sensitivity of the TSCM. This resulted in the TSCM activating sooner in the trailer sway process and thereby providing a greater level of trailer sway control.

3) The third series of test runs was with the ***FTSC active*** and the ***TSCM active (with new lower sway sensitivity thresholds)***. With this setting, the TSCM activations were stronger and the FTSC activated less often since the stronger TSCM activations reduced the need for the FTSC to activate. The sway damping with this configuration (0.144 at 100 km/h) met the requirements of J2807.

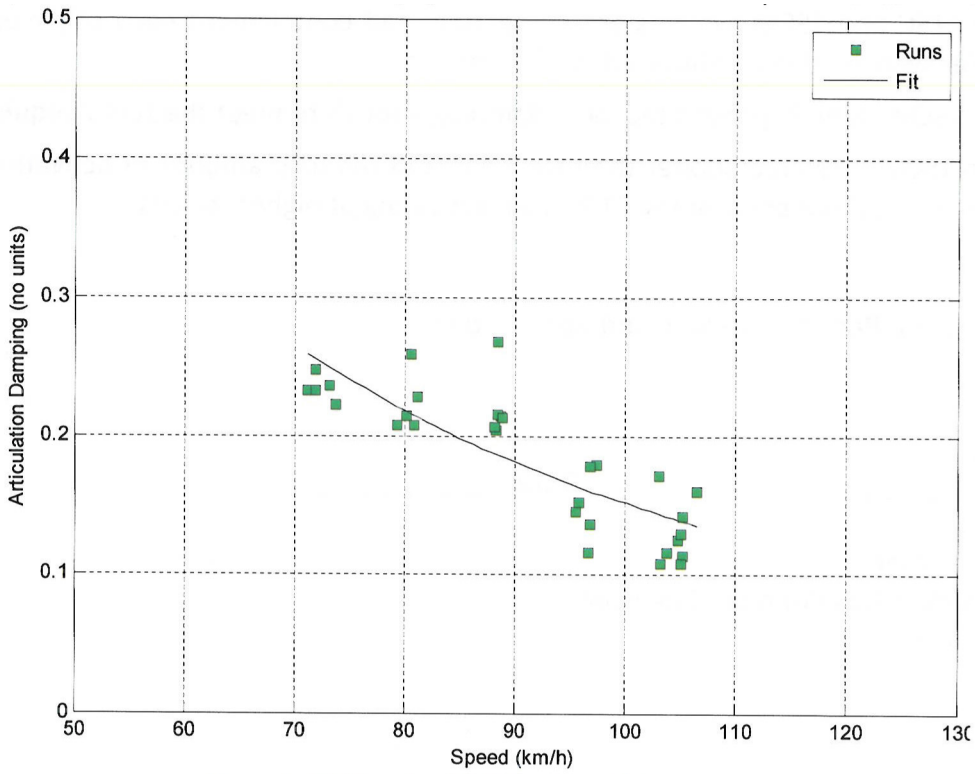

Figure 2- FTSC active, TSCM active with lower thresholds

4) The fourth series of test runs was with the *FTSC inactive* and the *TSCM active (with the same lower sway sensitivity thresholds as in #3)*. The TSCM activated and the damping level was 0.139 which meets sway damping requirement of J2807.

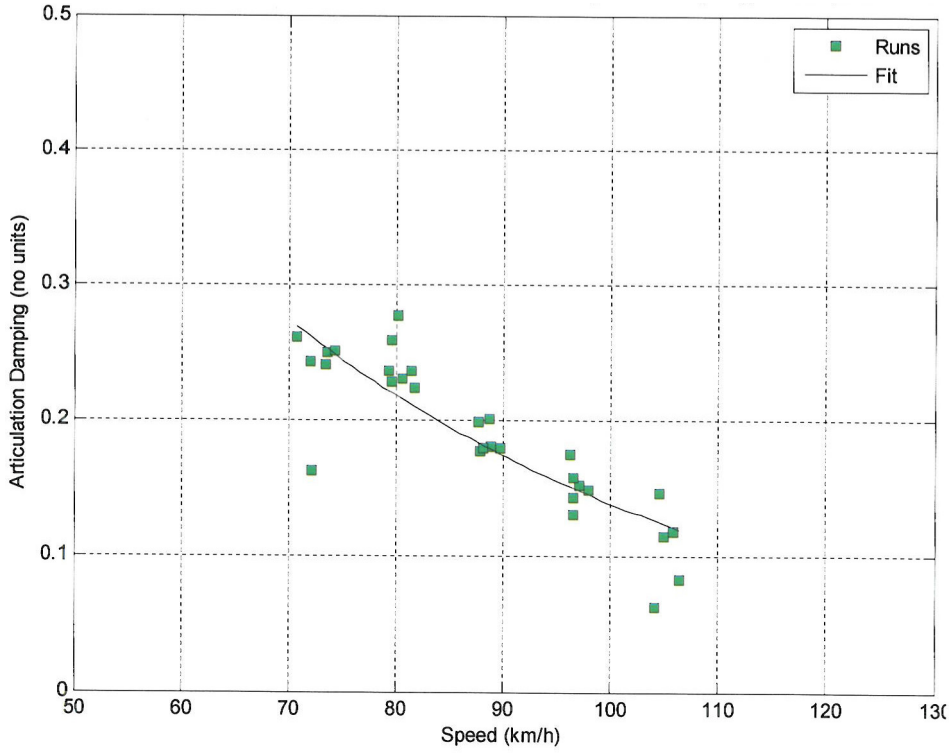

Figure 3- FTSC inactive, TSCM active with lower thresholds

TESTING CONCLUSIONS

1) The FTSC and TSCM systems are compatible and complement each other under the trailer sway testing conditions described herein.
2) The TSCM alone improved the sway damping enough to meet the J2807 requirement.
3) The TSCM activated sooner than the FTSC and reduced amount of activation by the FTSC, but did not prevent the FTSC from activating at higher speeds.

Testing Results and Report Reviewed and Approved by:

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