



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: EA 08-007
 Prompted By: VOQ & EWR Field Reports
 Date Opened: 03/14/2008 Date Closed: 03/31/2009
 Principal Investigator: Bruce York
 Subject: Violent Front End Oscillation

Manufacturer: Ford Motor Company
 Products: 2005-2007 F-250 & F-350 Super Duty 4X4 Vehicles
 Population: 520,909

Problem Description: Severe front suspension and steering wheel oscillations after the vehicle traveled over an uneven road surface.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	206	1717	1923
Crashes/Fires:	1	3	4
Injury Incidents:	6	3	9
# Injuries:	2	2	4
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	Confidential	Confidential	Confidential

*Description of Other: Related EWR field reports.

Action: This Engineering Analysis has been closed.
 FORD is conducting an owner notification program (#09L02) copy attached.
 NHTSA TSB # (10028404).

Engineer: Bruce York *BY* Date: 03/31/2009
 Div. Chief: Richard Boyd Date: 03/31/2009
 Office Dir.: Kathleen C. DeMeter Date: 03/31/2009

Summary: This investigation was opened based on 78 consumer complaints of severe suspension and steering wheel oscillations after the subject vehicles traveled over an uneven surface. ODI was concerned about these complaints because many of them alleged loss of control and the loss of control occurred at speeds above 50 miles per hour. At the time these complaints were received, ODI was also aware of the TSB 07-10-10 and Early Warning Field reports that discussed the shimmy condition on the subject vehicles.

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Since opening this investigation, ODI has confirmed, based on consumer complaints, warranty data, testing conducted by VRTC, and ODI inspection of complaint vehicles, that the owners of the subject vehicles are experiencing shimmy events on their vehicles. However, ODI has also confirmed that owners typically do not maintain their tires at the pressures recommended by Ford on the tire label. Further, ODI has found that in order for shimmy to occur, tire pressures must be substantially below (at least 20%) those specified on the vehicle tire label. ODI considers these unsafe tire conditions to be the result of one of three typical situations. The tires are being improperly maintained, the owners are intentionally setting the tire pressures low to enhance ride quality, or aftermarket tires (not designed for use on the vehicle) are installed to change the appearance or function of the vehicle. The subject vehicles are intended and designed to be used as heavy duty vehicles and as such require that the tires be capable of handling the loads for which the vehicle is designed and marketed. In order for the tires to be capable of handling these loads, the proper tire pressure must be maintained.

In light of the information gathered in this investigation and Ford's agreement to notify subject vehicle owners (now and every two years until the vehicles reach ten years from their production date) about the importance of maintaining proper tire pressures on their vehicles, further use of agency resources does not appear to be warranted. The closing of this investigation does not constitute a finding by NHTSA that no safety-related defect exists. The agency reserves the right to take further action if warranted by the circumstances.

For additional information, see the attached closing report.

ENGINEERING ANALYSIS CLOSING REPORT

SUBJECT VEHICLES: 2005 through 2007 Ford F-250 and F-350 Super Duty 4x4 Vehicles

EA No.: 08-007

Date Opened: 14-Mar-08

Date Closed:

BASIS: ODI opened this investigation based on 78 consumer complaints received during the Preliminary Evaluation concerning severe suspension and steering wheel shimmy and oscillations occurring after the subject vehicles traveled over an uneven road surface.

THE ALLEGED DEFECT: Severe front suspension and steering wheel oscillations after the vehicle travels over an uneven road surface potentially causing unintended lane change or road surface departure.

VEHICLE POPULATION: Ford sold 520,909 vehicles in the United States. Table 1. shows the production volumes by model and model year.

<u>Model</u>	<u>Model Year</u>	<u>Production</u>
Ford F-250 4x4	2005	117975
Ford F-250 4x4	2006	139536
Ford F-250 4x4	2007	42796
Ford F-350 4x4	2005	84655
Ford F-350 4x4	2006	103783
Ford F-350 4x4	2007	32164

Table 1. Subject Vehicle Production Data

DESCRIPTION OF COMPONENTS: The subject vehicles' front suspension consists of a solid front axle, radius arms, coil springs, track bar, and shock absorbers. Steering of the subject vehicles is accomplished by means of a steering box, pitman arm, steering linkages, and a steering damper. The steering linkages include the drag link and tie rod. These components are pictured and identified in Figure 1. The pitman arm transmits motion from the steering box into the drag link, causing it to move left or right to turn the wheels in the appropriate direction. The drag link converts rotation of the pitman arm to the right steering knuckle and the tie rod. The tie rod connects the two front wheels so that when one of the wheels is turned the other wheel is turned in the same direction. The steering damper is attached between the drag link and the frame of the vehicle to dampen vibration and oscillations of the steering system. The track bar provides lateral location of the solid axle. This design ties the two front corners of the vehicle together such that forces generated on one wheel are transferred to the other wheel causing a reaction force. Energy within the front suspension is also transferred to the vehicle's frame through a track bar and to the steering wheel through the steering box. The tires used on the subject vehicles are Light Truck (LT) rated tires. The recommended inflation pressures (placard pressure) for the tires are found on the tire label located on the B-pillar or the rear edge of the

driver's side door. Placard pressures for the front tires of the subject vehicles range from 65 psi to 75 psi depending on the exact model and configuration.

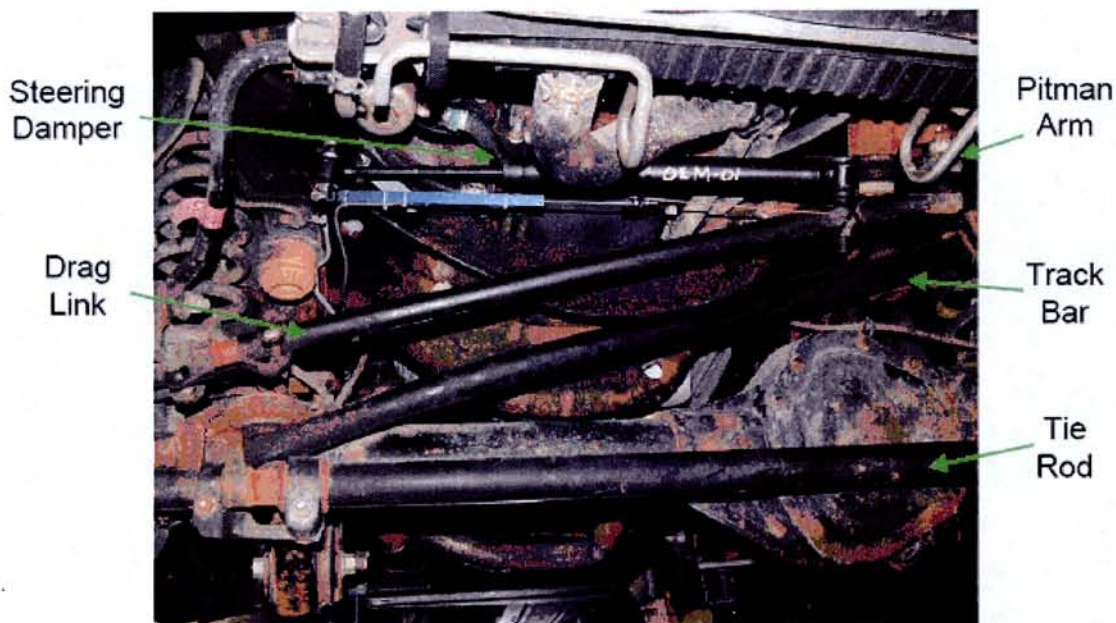


Figure 1. Steering and Suspension Components

CORRESPONDENCE: Table 2. lists the correspondence dates between Ford and NHTSA.

NHTSA to MFR	MFR to NHTSA	NHTSA to MFR Supplement	Confidentiality		
			Date of Request	Date of NCC Response	Items Confidential
26-Nov-2007	04-Feb2008		07-Feb-2008	26-Aug-2008	App. J
			10-Oct-2008	29-Jan-2009	App. J

Table 2. Correspondence Between Ford and NHTSA

PROBLEM EXPERIENCE: Table 3. summarizes the number of reports ODI has received related to the alleged defect in the subject vehicles. At the time of this report, ODI had received 206 complaints of steering or suspension system oscillations in the subject vehicles. Six of the complaints allege that a crash occurred as a result of a shimmy event and two complaints allege that injuries resulted from shimmy events. Twenty five of the complaints allege that as a result of the severe shimmy the vehicle swerved partially out its lane or off the road surface. Three complaints allege steering component failures, two complaints allege the steering wheel was jerked from the driver hands, and two complaints allege one of the doors flew open as a result of the shimmy. In addition to the complaints that ODI has received, Ford has provided 543 consumer complaints and 1174 field reports related to a shimmy event, three of which allegedly resulted in a crash and two of which allegedly resulted in injury. None of the crash or injury incidents received from consumers were confirmed by ODI to determine if a shimmy event was

the cause of the accident. In one of the crashes reported to ODI by Ford, Ford found that the tire pressures on the vehicle were substantially lower than recommended on the vehicles tire label.

<u>Problem Experience</u>	<u>EA Open</u>		<u>EA Close</u>	
	ODI	MFR	ODI	MFR
<u>Owner Reports</u>	78	543	206	543
<u>Field Reports</u>	0	1174	0	1174
<u>Warranty Claims</u>	NA	20110	NA	20110
<u>Crash Incidents</u>	1	3	6	3
<u>Injury Incidents</u>	1	2	2	2
<u>Injuries</u>	1	2	2	2
<u>Fatal Incidents</u>	0	0	0	0

Table 3. Problem Experience

As part of this investigation, ODI compared the complaint rates for the subject vehicles to those of similar or “peer” vehicles. The peer vehicles that ODI used for comparison were MY 2005 through 2007 F-Super Duty vehicles a 2 wheel drive (4x2) drive-train, F-Super Duty vehicles manufactured with different engine types, and F-Super Duty vehicles built in 2004 with a leaf spring style suspension. ODI also compared the subject vehicles to similar size 4x4 vehicles manufactured by General Motors (GM). The results of the rate analyses are shown in Charts 1, 2, and 3.

Subject Vehicle Complaint Rates By Drive Type
Model Year/Model/Drive Type vs. Complaint Rate
Ford Data Only

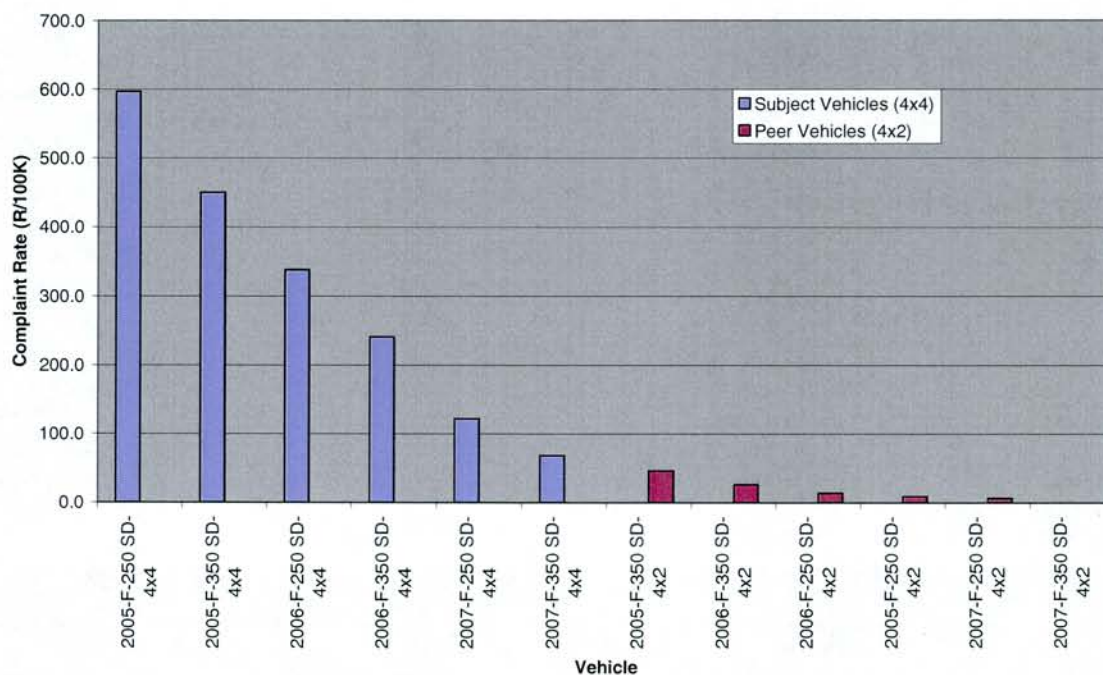


Chart 1. Complaint Rate Analysis

**Subject and Peer Vehicle Complaint Rates
GM and 2004 MY Ford Leaf Spring Peer Vehicles vs. Complaint Rate
ODI Data Only**

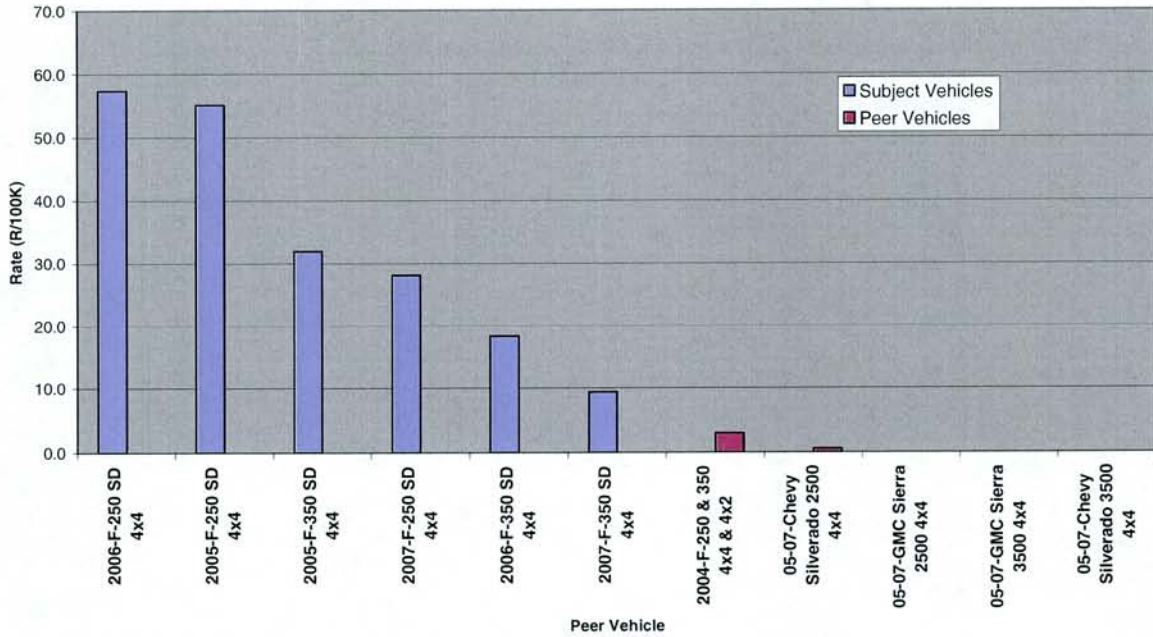


Chart 2. Complaint Rate Analysis

**Subject Vehicle Complaint Rate By Engine
Model Year/Model/Engine vs. Complaint Rate
Ford Complaints Only**

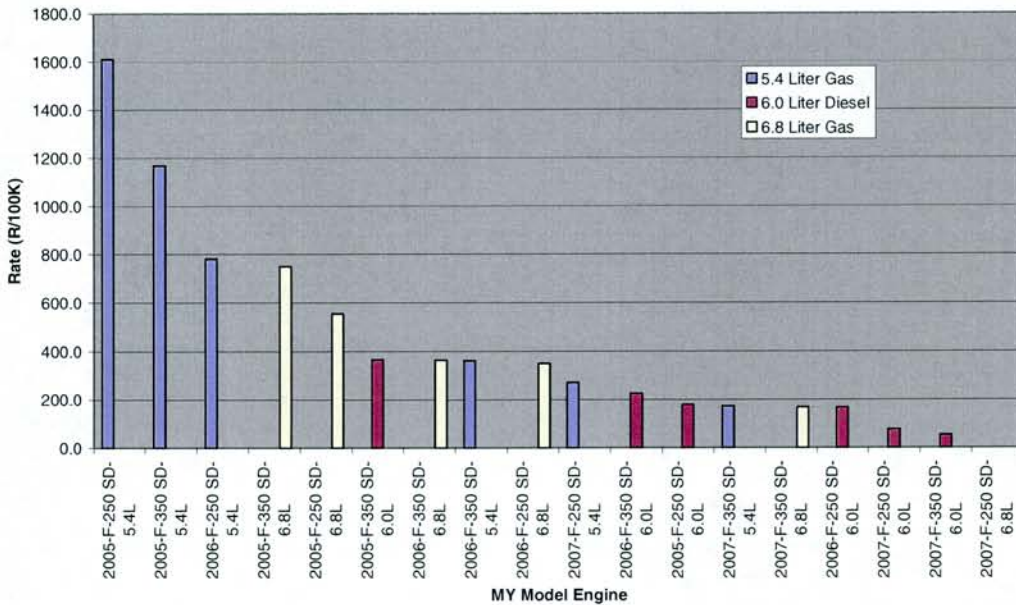


Chart 3. Complaint Rate Analysis

Chart 1. shows that the subject vehicles have a higher complaint rate than similar sized 4x2 vehicles. These 4x2 vehicles do not have a solid front axle and therefore forces generated on one

wheel are not transferred to the other wheel as occurs on the subject vehicles. Chart 2. shows the subject vehicles complaint rates compared to 2004 Ford Super Duty vehicles built with a leaf spring style suspension and peer vehicles manufactured by GM. The GM vehicles are manufactured with a torsion bar (4x4) or a coil spring (4x2) suspension. This chart shows that the subject vehicles with the lowest complaint rate have a rate over three times that of the 2004 Super Duty vehicles and over 15 times that of the GM vehicle with the highest complaint rate (the MY 2005 through 2007 Chevy Silverado 2500 4X4).

Chart 3. shows that the subject vehicles with gasoline engines have a higher complaint rate than subject vehicles with diesel engines.

WARRANTY: Warranty data submitted by Ford in response to the 11/26/07 IR letter identified 20,110 warranty claims potentially related to the alleged defect condition in the subject vehicles. The data indicate that the alleged defect condition, identified from claims of vehicle vibration, steering vibration, steering wander, and harsh ride, has occurred on more than 3.8 percent for the subject vehicles. The warranty rate for similar 4x2 vehicles with an independent front suspension design was 0.4 percent. These warranty claim rates are shown in Chart 4. Chart 5. presents subject vehicle warranty rates by drive type and shows that the 4x4 vehicles have a higher claim rate than the 4x2 vehicles. The subject vehicle model with the lowest warranty claims rate (the MY 2007 F-350 SD 4X4) is nearly 11 times that of the 4x2 model with the highest warranty rate (the MY 2005 F-350 SD 4X2).

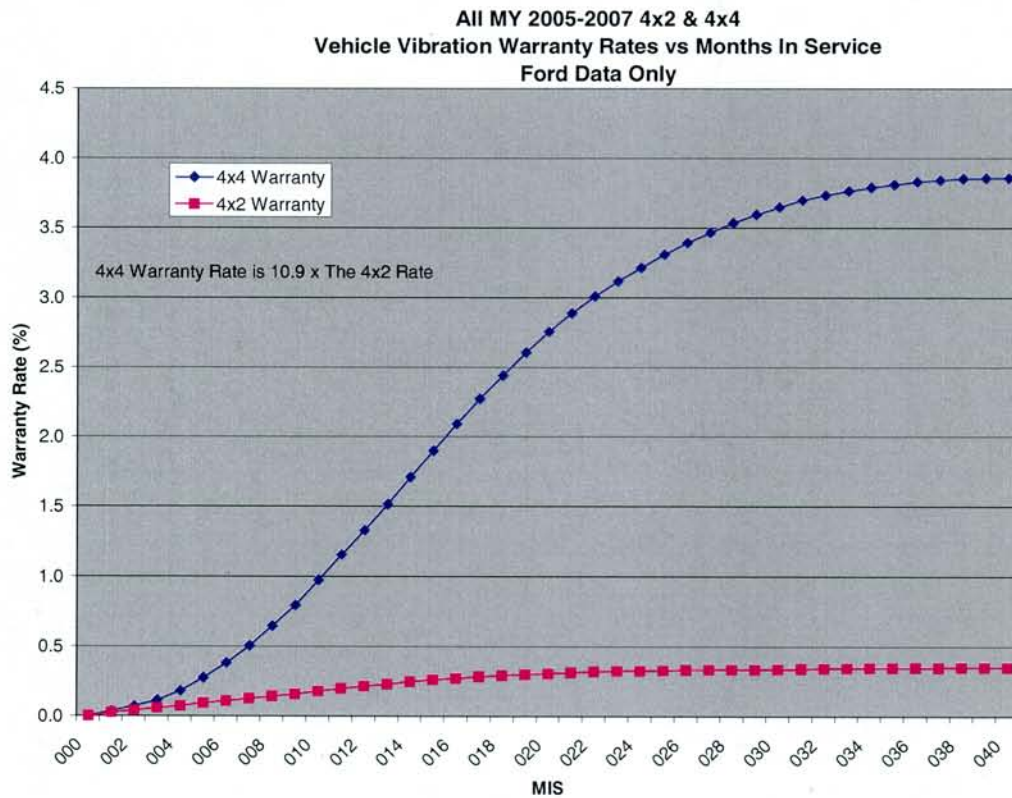


Chart 4. Warranty Rate Analysis

**Subject Vehicle Warranty Rates By Drive Type
Model Year/Model/Drive Type vs. Warranty Rate
Ford Data Only**

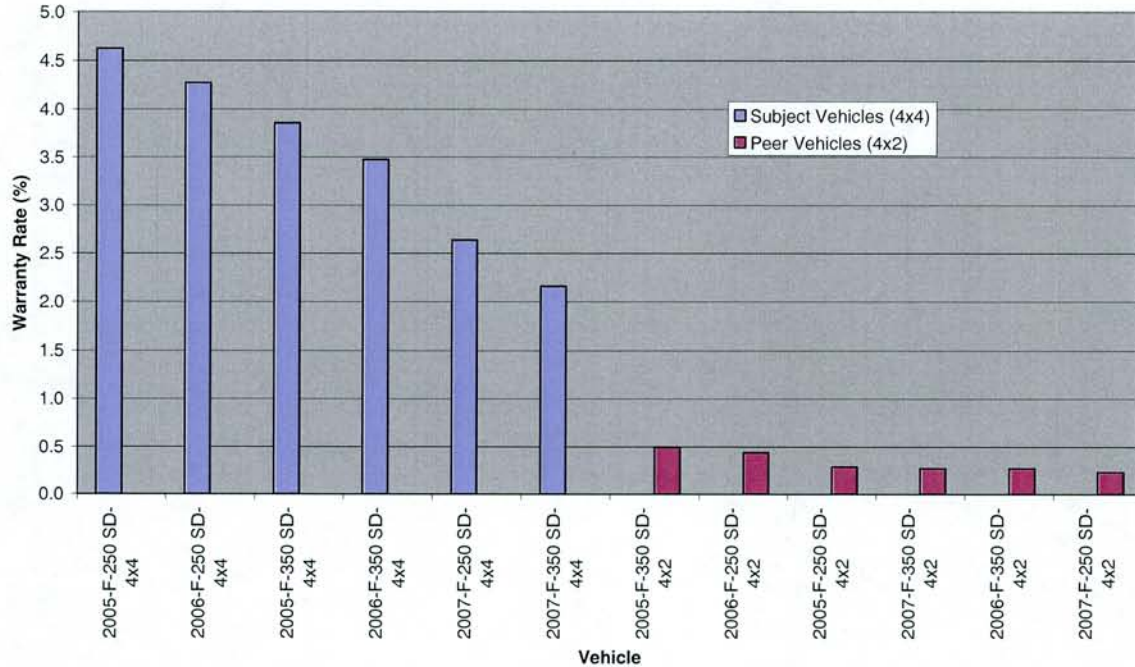


Chart 5.

SERVICE BULLETINS: Ford issued six service bulletins related to steering wheel oscillation between December 2004 and May 2007 (Table 4.). The bulletins all relate to concerns associated with “steering wheel oscillation immediately following wheel impacts.” The primary repair procedure for all of the bulletins is for the service technician to “set the tire pressures as indicated on the vehicle tire label”.

<u>Ford TSB #</u>	<u>Date</u>	<u>Vehicles</u>	<u>Problem Description</u>	<u>Primary Repair Procedure</u>
04-26-01	31-Dec-04	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label
05-22-01	14-Nov-05	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label
06-15-01	14-Jul-06	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label
06-22-14	25-Oct-06	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label

07-05-07	19-Mar-07	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label
07-10-10	28-May-07	2005 – 07 F-Super Duty	Vehicles may exhibit steering wheel oscillation immediately following wheel impacts.	Set tire pressures as indicated on the vehicle tire label

Table 4. Technical Service Bulletins, Steering Wheel Oscillation

PREVIOUS INVESTIGATIONS: In two previous investigations, ODI considered front axle shimmy as a potential safety related defect. Table 5. summarizes some aspects of these prior investigations.

Investigation C81-01 involved MY 1979 Toyota HiLux pickup trucks in which there was front end shimmy and, in some instances, loss of control. ODI received reports of three alleged crashes resulting in two severe injuries. An investigation (not conducted by ODI) into one of the crashes showed the shimmy condition as a possible cause of the crash. Toyota alleged that the shimmy events were caused by lack of maintenance. Toyota felt that the owners of these vehicles were not keeping their vehicle front end aligned, or their wheels properly balanced. ODI conducted testing of the Toyota vehicles and found that the vehicles would shimmy even with the vehicle's wheels balanced, the front end aligned, new shock absorbers installed, and a new idler arm installed. Further testing showed that the shimmy event would not occur if a steering damper were installed. In ODI's view, the shimmy on the Toyota vehicles likely was not maintenance related. Toyota recalled the vehicles and installed a steering damper.

Investigation EA90-021 involved MY 1987 through 1989 Hyundai Excel vehicles experiencing shimmy. ODI received reports of five crashes alleged to be related to shimmy, but none could be attributed to shimmy. The manufacturer alleged that the shimmy events were caused by an imbalanced condition of the vehicle, including tire imbalance and improper alignment. In ODI's view, the excitation of the vibration was related to maintenance items such as wheel alignment, tire condition and balance, and the condition of the DOJ and CV joints. Test results supported this position and ODI closed the investigation.

INV NO	DATE CLOSED	MFR	MY	MODEL	POP	ALL COMP	R/ 100K	CRSH	DESC	RESULT
C81-01	10/23/1981	TOYOTA	1979	HILUX PICKUP TRUCK	44,000	106	240.9	5	ALLEGED EXCESSIVE VIBRATION AND SHIMMY	81V-132
EA90-021	4/30/1991	HYUNDAI	1987-1989	EXCEL	707,410	300	42.4	2	EXTREME SHIMMY AT HIGHWAY SPEEDS	CLOSED
EA08-007	OPEN	FORD	2005-2007	F-250, F-350 SD	520,909	2086	400.5	2	EXTREME SHIMMY AT HIGHWAY SPEEDS	ONP

Table 5. Previous Shimmy Related Investigations

TESTING: To assess the severity and the causes of shimmy events on subject vehicles, NHTSA's Vehicle Research and Test Center (VRTC) was tasked with conducting investigative testing. VRTC tested vehicle operation relative to various road conditions, tire pressures, and steering system configurations to determine what affect they had on the occurrence and severity of the shimmy event. Testing was conducted from March through December 2008.

Test Description: VRTC used two MY 2006 Ford F-250 Super Duty 4x4 trucks in shimmy testing. VRTC also conducted tests on a complaint MY 2005 F350 and two peer vehicles. The peer vehicles were a MY 2001 Chevy 3500 4x4 (independent front suspension) and a MY 2000 F350 4x4 (solid axle, leaf spring suspension). All vehicles were tested with original equipment tires. The shimmy events were initiated by driving over single road perturbations (bumps or pot holes) and multiple perturbations spaced at various intervals. Tests were conducted with tires set at placard pressure and with tire pressures reduced in 5 psi increments until shimmy occurred or until tire pressure dropped to 50 psi. Tests were run at different speeds, from 75 miles per hour (mph) to 45 mph, at various vehicle weights and loads, and with different steering dampers.

Test Results: During testing, VRTC did not induce a shimmy event on a subject vehicle when tires were inflated to the Ford specified tire pressures. VRTC noted that maintaining correct tire inflation pressure is critical in preventing a shimmy event from occurring on subject vehicles.

VRTC also found the following during testing:

1. The subject vehicle original equipment steering damper, known as the 5C34, had little damping influence on a self sustained shimmy. During a shimmy, the pitman arm and drag link oscillated between 0.4 and 0.6 inches. The compliance in the end bushings prevented the damper from being effective at this small displacement. Also, the 5C34 attached to the drag link at an angle and with a cantilevered stud, a configuration that causes the drag link to twist instead of transferring motion into the damper. The 5C34 had a lower resistance force curve than other steering dampers tested.
2. With the replacement steering damper known as the 8C34 (referenced in the Ford TSBs), the front end of the vehicles performed better than with the 5C34. The 8C34 did not prevent shimmy but it reduced the chance of shimmy (shimmy on vehicles equipped with the 8C34 occurred at lower tire pressures than vehicles equipped with the 5C34) and it reduced the severity of the shimmy, resulting in less vibration. The 8C34 was designed with a higher resistance and an internal air bag to prevent hydraulic fluid from mixing with air in the cylinder. Ford listed the 8C34 as the replacement damper for the original equipment 5C34 damper in TSB 07-10-10.
3. Worn tires increase the likelihood of shimmy. VRTC found that when tested at the same speed, tires with 5/32" tread depth (new depth was 13/32") typically would shimmy when underinflated by approximately 20% of the placard pressure, whereas tires with 11/32" tread depth typically did not shimmy until underinflated by approximately 50%.
4. A vehicle equipped with after market tires that were not Light Truck (LT) rated or with less than Load Range E would be more likely to experience a shimmy event. One complaint vehicle was equipped with P-type tires rated for a passenger car or SUV. The tires had a lower load range and lower maximum pressure.
5. Several VOQ complainants said their truck veered into another lane when it shimmied. VRTC conducted extensive tests for yaw caused by the shimmy. When a test vehicle went over multiple bumps at 70 mph, the truck side stepped and yawed before any shimmy occurred. However, the primary test truck pulled to the left when hitting bumps on either the left side or right side. VRTC mounted accelerometers on the axles and strain gages on the pitman arm. High speed videos were made with four on board cameras and two external cameras. VRTC found that the test truck had a slight left bias from the power steering gear during the shimmy. During testing,

drivers would release the steering wheel and the truck would drift to the left but it was easily controlled. If a driver was not alert and holding the steering wheel firmly then the vehicle could veer into the left lane during a shimmy event.

6. VRTC also found that the test truck would yaw when the vehicle operator applied aggressive braking during a shimmy event. VRTC interviewed some VOQ complainants who said they "slammed" on the brakes. Typically, releasing the throttle will stop a shimmy event. During light braking, the intensity of the shimmy may increase momentarily as the speed decreases. The shimmy typically stops when speed drops below 45 or 40 mph.

VEHICLE INSPECTIONS: As part of its investigation, ODI inspected four complaint vehicles to better understand the conditions under which shimmy events occurred. During these inspections, the vehicles were driven to locations where shimmy events allegedly had taken place to see what the road conditions were that induced the event. None of the four inspected vehicles had its tires properly inflated. ODI could not induce a shimmy event on two of the four vehicles during several hours of driving. ODI could induce a shimmy event on the other two vehicles only after the tire pressures were reduced more than 26% below the placard pressure. The speeds required to induce the shimmy event were above 55 mph in one case and 65 mph in the second case. During one shimmy event, the vehicle continued on a straight path as the driver applied the brake, which resulted in the vehicle crossing the double yellow lines as the road turned to the right. The vehicle crossed the double yellow lines by approximately 2 feet. The vehicle did not lose steering capability but rather in reaction to the shimmy event, the driver grabbed the steering wheel with both hands and aggressively applied the brakes.

FAILURE MODES: Ford Technical Service Bulletin TSB 07-10-10 released May 28, 2007 explains that subject vehicles may exhibit steering wheel oscillation, immediately following front or rear wheel impacts (with road perturbations). This steering wheel motion is typically in the range of +/- 5 degrees, and typically dampens out in fewer than five oscillations. This TSB instructs that if a driver brings the vehicle in and complains about steering wheel oscillations the first repair procedure should be to set the tire pressure on the vehicle. The tire pressures should be set to the pressure specified on the tire label. The tire label is located on the B-pillar or the rear edge of the driver's side door. If after the tire pressures are adjusted the oscillations still occur, the TSB instructs that the steering damper should be replaced with a different model damper. The 5C34 Damper is to be replaced with the 8C34 damper. Then if either of these two repairs still does not remedy the oscillations, the TSB instructs that the caster of the vehicle should be reduced.

In response to the ODI Information Request (IR) letter dated 11/26/2007, Ford describes two distinct types of suspension or steering wheel oscillations resulting from front wheel impacts. The first type of oscillation that Ford describes is what they term a "torsional ring down". Torsional ring-down is a momentary condition that requires no driver response to eliminate. In this type of steering wheel oscillation, Ford states that the driver may experience a momentary steering wheel oscillation after a wheel impact, but that the oscillations will quickly dampen out. Ford says that the oscillations dampen out within 5 cycles or one to two seconds and without driver input. The second type of steering wheel oscillation that Ford describes is shimmy. Shimmy is described by the SAE as a self excited oscillation of a pair of steerable wheels about their steering axes accompanied by appreciable wheel tramp. In this case, the suspension and steering wheel start to oscillate violently and the oscillations are self sustained. In order for the driver to stop the oscillations he or she must take some action. The most common action is to apply the brakes and slow the vehicle down. In its IR response, Ford says that throughout the

shimmy event the vehicle remains controllable and can be steered and braked. Ford goes on to state that they believe that the shimmy events are far less frequent than the "ring down" events but that when they do occur it is a result of the vehicle having substantially under-inflated front tires.

WARNING SYMPTOMS: There are no warning lights or other indicators that a shimmy event is about to occur. The vehicle may experience "ring down" events prior to a shimmy event where the steering wheel vibrates for a short period of time without going into a self sustained vibration. However, these ring down events may be a normal occurrence on the vehicle and so may not necessarily warn the driver that they are about to experience the violent shaking and vibration of a shimmy event. A majority of the 31 complainants interviewed who had experienced a shimmy event stated that they were surprised and scared the first time the shimmy event occurred. Drivers typically were not as surprised or scared during subsequent shimmy events.

FORD'S EVALUATION OF THE ALLEGED DEFECT: Ford has conducted extensive investigation into this subject and found that the vast majority of customer complaints provided in this response relate not to shimmy, but rather to torsional ring-down. Ford argues that shimmy events likely are caused by severely under-inflated tires, and may be influenced by aftermarket modifications to the front suspension, including installation of aftermarket tires or lift kits. Ford contends these conditions are not an indication of a defect in the product produced by Ford.

Even if shimmy occurs, Ford's evaluations have not found shimmy to present a risk of loss of vehicle control. Consequently, Ford believes the condition does not present an unreasonable risk to motor vehicle safety. The lack of accidents and injuries as a result of either shimmy or the more typical momentary torsional ring-down condition supports our assessment that neither condition poses an unreasonable safety risk. In order to address both phenomena, Ford has issued a TSB to help technicians better diagnose and repair either condition.

ODI ANALYSIS: This investigation was opened based on 78 consumer complaints of severe suspension and steering wheel oscillations after the subject vehicles traveled over an uneven surface. ODI was concerned about these complaints because many of them alleged loss of control and the loss of control happened at speeds above 50 miles per hour. At the time these complaints were received, ODI was also aware of the TSB 07-10-10 and Early Warning field reports that discussed the shimmy condition on the subject vehicles.

Since opening this investigation, ODI has received 206 consumer complaints related to the shimmy event on the subject vehicles. These complaints along with the warranty, complaint and field report data provided by Ford show that the subject vehicles have a very high rate of shimmy occurrence and are more likely to experience a shimmy event than peer vehicles. The complaints caused ODI to be concerned that the shimmy condition could lead to dangerous driving conditions and result in unintended lane changes and road surface departures.

In the past, ODI has considered the shimmy condition a potential safety related issue. In both of the prior investigations, ODI was concerned with a shimmy event that caused the driver to lose control of the vehicle, change lanes unintentionally or leave the road surface. The focus of these prior investigations was not only on whether the shimmy could cause the driver to lose control of the vehicle but also on why the shimmy event occurred. In investigation C81-01 it was found

that the shimmy event on the subject vehicles was the result of a vehicle design flaw that could be remedied with the addition of a steering damper. The shimmy condition was not found to result from the owners' lack of vehicle maintenance. A recall was issued for this condition. In investigation EA90-021 the shimmy condition on the subject vehicles was found to be the result of lack of vehicle maintenance and could be remedied with proper front end alignment and tire balancing. No recall was issued for this condition.

During the current investigation, the shimmy event has allegedly resulted in nine crashes and four injuries in the subject vehicles (these incidents have not been confirmed by ODI). Twenty five of the complaints received by ODI allege that the vehicle had an unintended lane change or road surface departure. During one vehicle inspection a shimmy event caused the vehicle to continue traveling straight as the road turned to the right resulting in a lane departure.

Testing conducted by VRTC showed that shimmy events on the subject vehicles occurred when the front tires were substantially underinflated, but did not occur when tires were inflated in accordance with pressures on the tire label. VRTC also found that issues such as tire wear and replacement tire type also have an effect on whether the vehicle will experience a shimmy event. A shimmy event could not be induced by ODI during testing on a vehicle equipped with proper tires that were inflated to within 80% of the Ford recommended tire pressure. ODI inspections of complaint vehicles showed all vehicles were equipped with tires underinflated by at least 20% below Ford recommended pressures and could not be induced to experience a shimmy event until their tire pressures were 26% below Ford recommended pressures.

REASON FOR CLOSING: Based on consumer complaints, warranty data, testing conducted by VRTC, and ODI inspection of complaint vehicles, ODI has confirmed that the owners of the subject vehicles are experiencing shimmy events on their vehicles. However, ODI has also confirmed that owners typically do not maintain their tires at the pressures recommended by Ford on the tire label. Further, ODI has found that in order for shimmy to occur, tire pressures must be substantially below (at least 20%) those specified on the vehicle tire label. ODI considers these unsafe tire conditions to be the result of one of three typical situations. The tires are being improperly maintained, the owners are intentionally setting the tire pressures low to enhance ride quality, or aftermarket tires (not designed for use on the vehicle) are installed to change the appearance or function of the vehicle. The subject vehicles are intended and designed to be used as heavy duty vehicles and as such require that the tires be capable of handling the loads for which the vehicle is designed and marketed. In order for the tires to be capable of handling these loads, the proper tire pressure must be maintained.

The owners of the subject vehicles should be made aware of the potential for a shimmy event. A shimmy event typically occurs when consumers allow or intentionally set the tire pressures on their vehicles to over 20% below the placard pressures or install aftermarket or oversized tires that are not recommended by Ford as replacement tires. Owners of the subject vehicles should be informed with an explanation of shimmy, what conditions can cause it, and how to avoid it. Consumers also should be instructed on the appropriate response to a shimmy event: ease off the throttle and, if necessary, gently apply the brakes until the shimmy stops. The shimmy may increase slightly as the driver slows but it typically will stop by 45 mph. The driver should then have the vehicle tire pressures checked and adjusted to the recommended pressures found on the vehicle tire label.

As a result of this investigation, Ford will mail an owner notification letter to all owners of subject vehicles describing the shimmy event, explaining the importance of maintaining proper tire pressure in preventing shimmy, identifying the danger of installing improper replacement tires and suspension modifications, and the potential consequences involved. Ford will re-notify all subject vehicle owners every two years until the vehicles reach 10 years from their production date. A copy of the notification letter is attached to this closing report (Attachment 1).

In light of the information gathered in this investigation and Ford's agreement to notify subject vehicle owners (now and every two years until the vehicles reach ten years from their production date) about the importance of maintaining tire pressures on their vehicles, further use of agency resources does not appear to be warranted. The closing of this investigation does not constitute a finding by NHTSA that no safety-related defect exists. The agency reserves the right to take further action if warranted by the circumstances.



Ford Motor Company
 Ford Customer Service Division
 P. O. Box 1904
 Dearborn, Michigan 48121

April 2009

Literature Program 09L02

Mr. John Sample
 123 Main Street
 Anywhere, USA 12345

Your Vehicle Identification Number: 12345678901234567

As the owner of a 200X F-Super Duty truck, your vehicle satisfaction is very important to us.

It has come to our attention that some owners of F-Super Duty 250/350 4x4 vehicles have experienced severe steering wheel and front wheel vibrations and oscillations after traveling over a bump or dip in the road. Ford Motor Company and the National Highway Traffic Safety Administration have been studying this condition, sometimes known as shimmy.

What is the issue?

Your vehicle may experience shimmy, a severe vibration and oscillation in the steering wheel that begins after the vehicle travels over a bump or dip in the road and does not dampen out by itself. The condition may cause the cab of the truck to vibrate significantly.

Shimmy differs from the more typical, slight oscillation of the steering wheel that may occur immediately following wheel impacts and disappears on its own. This type of steering wheel oscillation is a normal characteristic of most trucks, especially a 4x4 vehicle with a solid front axle.


What should you do?

TO PREVENT SHIMMY:

Maintain Recommended Tire Inflation Pressures

Some Super Duty customers intentionally lower the tire pressures on their truck to change the ride characteristics. If you do not maintain the tire inflation pressures at the levels specified by Ford, your truck may experience shimmy. This condition results from significant tire under-inflation. Please visit the National Highway Traffic Safety Administration's website (www.safercar.gov) for more information regarding the importance of maintaining proper tire inflation pressures.

REMINDER: The proper tire inflation pressures are found on the tire label which is located on the B-pillar or on the rear edge of the driver's door.




TIRE AND LOADING INFORMATION

SEATING CAPACITY : TOTAL X , FRONT X , REAR X

The combined weight of occupants and cargo should never exceed : XXX kg or XXX lbs.

TIRE	SIZE	COLD TIRE PRESSURE	SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION
FRONT	LT265/70R17E	XXX KPA, XX PSI	
REAR	LT265/70R17E	XXX KPA, XX PSI	
SPARE	LT265/70R17E	XXX KPA, XX PSI XXX KPA, XX PSI	



Tire pressure should be checked and set with cold tires before the vehicle is driven. It is necessary to adjust air pressure in tires periodically. Tire pressure changes with outside air temperature, and can lose approximately one pound per square inch (psi) of air pressure per month.

Use Only Proper Replacement Tires

Only install LT (Light Truck) load range E replacement tires that are the same size, type and speed rating as those originally installed on your vehicle. Under no circumstances should P-metric (Passenger) tires be installed.

Tires should be replaced prior to the tread depth being under 1/16th of an inch.

Do Not Make Suspension Modifications

Ford does not recommend the installation of after-market lift kits, stabilizer bars, or replacement parts that are not equivalent to the original factory equipment.

IF YOUR VEHICLE EXPERIENCES SHIMMY:

In the event your vehicle experiences shimmy, you should slowly reduce speed by either lifting off the accelerator pedal or lightly applying the brakes. The shimmy will cease as the vehicle speed decreases.

What if you no longer own this vehicle?

If you no longer own this vehicle, and have an address for the current owner, please forward this letter to the new owner.

You received this notice because our records, which are based primarily on state registration and title data, indicate that you are the current owner.

Can we assist you further?

If after setting the tire pressures on your truck to the Ford specified levels, you believe the vehicle needs additional service, please contact your local Ford dealer. If you have any questions, please contact your dealership's Service Manager for assistance.

RETAIL OWNERS: If you still have concerns, please contact the Ford Customer Relationship Center at 1-866-436-7332 and one of our representatives will be happy to assist you. For the hearing impaired call 1-800-232-5952 (TDD). Representatives are available Monday through Friday: 8:00AM - 5:00PM (Your Local Time).

If you wish to contact us through the Internet, our address is:
www.ownerconnection.com.

FLEET OWNERS: If you still have concerns, please contact the Fleet Customer Information Center at 1-800-34-FLEET, Option #3 and one of our representatives will be happy to assist you. Representatives are available Monday through Friday: 8:30AM - 5:00PM (Eastern Time). Or you may contact us through the internet at www.fleet.ford.com.

As described in your Owner Guide, proper maintenance is the best way to help ensure you continue to get the safety, fuel economy, performance, dependability, and the long life you expect from your vehicle.

Thank you for your attention to this important matter.

Ford Customer Service Division