

Mitsubishi requested guidance on what should be done to avoid foot rest contact. They stated that the dummy could be rotated about the center of the waist area to get the foot off of the foot rest. Mitsubishi also requested guidance on what to do if the foot were to get caught behind the clutch or brake pedal or between the pedal and the foot rest.

Toyota stated that placing the left knee "the same distance from the midsagittal plane of the dummy as the right knee," as specified by S16.3.2.1.8, would naturally position the left foot on the foot rest. However, according to S16.3.2.2.3, the left foot is not to be placed on the foot rest. Toyota stated that priority should be given to positioning the dummy so that the left foot is not on the "wheel-well projection or foot rest."

We have determined that further guidance is required as to the necessary action to be taken if foot rest/wheel well contact occurs. The regulatory text, in S16.3.2.2.5, does give guidance on what to do if pedal interference occurs. We are clarifying the guidance on pedal interference and extending it to foot rest contact.

Currently, to avoid pedal contact, the foot may be rotated and, if necessary, the leg may be rotated at the hip. Although rotation of the foot and hip may be effective at clearing contact with the pedals, in vehicles with a small space between the pedal and foot rest, this action may lead to contact with the foot rest. However, an effective means of clearing both pedal and foot rest/wheel well contact may be to fit the foot under the pedal. To achieve this, the ankle joint may need to be extended such that the toes are closer to the toe pan.

We are establishing a prioritized list of three foot positioning adjustments to clear the undesirable contact. In order, starting with highest priority, the first is foot rotation (adduction/abduction), the second is ankle joint extension (foot plantar flexion), and the third is leg rotation at the hip. Each subsequent adjustment allows all previous adjustments.

For some vehicles there may be no position which totally avoids pedal and foot rest contact. For these situations, pedal avoidance has priority. This may, in some small percentage of vehicles, force the foot to rest partially on the foot rest. Although some petitioners wished to avoid such positioning, the only other alternative would be to force foot positioning on the entire foot rest. However, we believe that this is a more unnatural position than partial foot rest contact.

#### *B. Right Foot—5th Percentile Adult Female Test Dummy (Barrier Test)*

Autoliv petitioned the agency to provide guidance on instances where the driver's right foot cannot reach the floor when positioned according to S16.3.2.2. Autoliv stated that one solution would be to lower the seat, but that this may not work for all vehicles. The Ford RFI also indicated that there are some Ford models where the driver's right heel cannot touch the floor while maintaining the specified contact with the accelerator.

Autoliv's request for guidance has merit; however, the agency does not believe that lowering the seat is an acceptable solution for any vehicle. To address the situation where the heel cannot initially contact the vehicle floor, the agency is amending the compliance test procedure to allow for the extension of the lower leg towards the accelerator pedal rather than leaving the leg hanging vertically. For the situation where the heel can initially contact the floor, but cannot maintain contact and reach the pedal, lower leg extension with the heel leaving the floor is also the preferred position. If the final position results in the heel being off of the floor, a spacer block is to be used to support the foot.

#### *C. Chin-on-Steering Wheel Test Procedure*

The Advanced Air Bag Rule adopted a low risk deployment test to address the risk air bags pose to out-of-position drivers, particularly those of small stature. The test is performed using two "worst case" positions: placing the dummy's chin on the module and placing the dummy's chin on the steering wheel. The December 2001 final rule amended S26.3.7 of FMVSS No. 208 to specify a point on the dummy's chin, which is to rest on the upper most point of the steering wheel, to adequately ensure that the dummy's chin would not catch on the steering wheel.

Volkswagen stated that the December 2001 amendments to S26.3.7 introduced additional steering wheel adjustment that could significantly affect the stringency of the test because of the lower position. They believed that there was no justification presented for the change and petitioned to amend the test as prescribed under the Advanced Air Bag Rule.

We believe the change in steering wheel position was justified. Toyota's petition for reconsideration of the Advance Air Bag Rule asked that NHTSA provide a more detailed test procedure to avoid the possibility of the

dummy chin hooking on the steering rim. As part of the response, we provided a well-defined contact point on the chin. Another part of the response was to allow for the repositioning of the steering wheel, if necessary, to get the chin and steering wheel to the proper relative position. Volkswagen stated that this change could result in more stringent requirements, yet as the agency stated in the December 2001 preamble, "(t)he purpose of the chin-on-rim test is to determine the risk of injury when a person's chest is directly in the path of the deploying air bag." (66 FR 65376, 65396.) The goal has always been to test in the worst-case configuration.

Autoliv stated that they were concerned that lowering the steering wheel to position the rim for contact with the dummy chin may pin the occupant in place, affecting the dummy injury readings. Autoliv petitioned the agency, asking for clarification on the amount of "effort" that should be exerted in positioning the steering wheel if contact occurs with the dummy legs. Ford raised similar concerns in their RFI. Autoliv also requested clarification on whether the agency's intent was to allow angular adjustment of the steering wheel, and, if adjustment other than angular adjustment of the steering wheel is allowed, what is the order of adjustment.

In response to the question raised by Autoliv, S26.3.7 is amended. The regulatory text will now limit adjustment to positions that would not cause contact between the dummy legs and steering wheel. This is consistent with the dummy positioning in the rigid barrier test, which uses the 5th percentile adult female test dummy (S16.3.2.1.8).

Conversely, clarification is not necessary in the regulatory text related to the allowable types of steering wheel adjustment. S26.3.2 indicates that the geometric center of the entire range of steering wheel adjustments is to be found. Therefore, when positioning the steering wheel to comply with S26.3.7, the tester is not limited to angular adjustment. Further, it is not necessary to specify the order of adjustment. Although it may be technically correct that the point of contact on the steering wheel may not be unique, *i.e.*, there may be a line of potential contact points, we believe the variation in the steering wheel orientation will be quite small.

Mitsubishi stated that the preamble to the December 2001 final rule appears to state that the initial thorax instrument cavity rear face angle should take precedence during dummy position, but further on in the preamble it appears