

# **Future Truck Position Paper: 2019-2**

## *Future Driver Accommodations: Equipment User Expectations for Driver Seating and Controls Packaging*

Developed by the Technology & Maintenance Council's (TMC)  
Future Cab & Driver Interface Task Force

### **ABSTRACT**

Having studied issues with driver seating and control packages for all known driver population profiles — especially ones of smaller stature — TMC's Future Cab & Driver Interface Task Force proposes in this paper that equipment manufacturers and suppliers develop “adjustable pedals” to accommodate the full range of drivers. Just as adjustable steering columns were necessary to accommodate larger stature drivers (especially ones with a large girth or long legs and shorter arms) and longer seat tracks were necessary to accommodate the long and short leg extremes of the driver population, the time has come to address the pedal issue.

### **BACKGROUND**

Various parties, including the not-for-profit group Women in Trucking, have brought to TMC's attention that current truck packages do not adequately accommodate smaller women drivers. TMC's Future Cab & Driver Interface Task Force has studied this issue and decided the problem extends beyond “smaller women” and includes all smaller stature drivers.

compared to the average man's weight and height of 213 lbs. and 5'10”.

- Current SAE packaging related standards (J1516, J1517, J826, J1521, J1522, J941, J1050, and J1052) use various mixes of males and females (5 percent female and 95 percent male, 10 percent/90 percent, etc.) and are all based on an outdated truck driver anthropometric database.

### **DISCUSSION**

Investigating this issue, the Task Force reports the following significant findings:

- Women drivers have an average weight of 160 lbs. and an average height of 5'4”

These standards were developed based on measurements using the accelerator heel point (AHP) as the starting point based on the premise all drivers must position their foot on

the accelerator to drive. While it was helpful in gathering data to use the AHP as the “Zero Point”, the AHP is not the best starting point for the standards. The SAE goal is to cover 95 percent of the truck driving population (2.5 percentile to 97.5 percentile) of the selected male/female mix.

An SAE Cooperative Research Project in conjunction with the National Institute of Occupational Safety & Health (NIOSH) has completed a more current survey\* of 1779 male and 171 female truck drivers recording 33 anthropometric measurements plus shoe length and width. The SAE packaging related standards have not been updated based using the latest anthropometric database.

## ISSUES

The Task Force concludes the low end of the standard distribution of small stature individuals (e.g., five percentile female) is smaller than the low end (2.5 percentile) of any of the SAE male/female mix formulas.

With current seating packages, it is challenging for a small driver to properly adjust the air suspension seats so that they can comfortably reach the pedals, gear shift levers, and instrument panels switches/controls. Smaller statured drivers (especially women) also experience difficulties with the three-point seat belt systems.

Most importantly, driver visibility is essential for the safe operation of the vehicle – externally through the daylight openings (DLOs) and gages and instruments inside the cab. It is hard if not impossible for smaller stature drivers to position themselves to mutually reach the necessary controls (pedals, shift lever, and steering wheel) and have good vision.

## RECOMMENDATIONS

TMC recommends the following actions:

- New 95th percentile eye ellipses be developed for each group of drivers - general male driver population, smaller stature ethnic groups (i.e., Asian, Hispanic, etc.) and female truck drivers.
- The position of the eye ellipse be designed for optimum vision both external (direct, indirect, and supplemental) and internal.
- Using this optimum eye ellipse position as the starting point, update the SAE Standards using the latest anthropometric database.
- This will undoubtedly result in the conclusion that the only way to accommodate the smaller stature driver is to develop adjustable pedals (accelerator, brake, and clutch).
- It is imperative that the adjustable pedal system be extremely robust and meet current TMC durability expectations (i.e., one million miles and/or 10 years service without failure).

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\**Anthropometric Study of U.S. Truck Drivers: Methods, Summary Statistics, and Multivariate Accommodation Models* (Publication Number 2015-116)