

# Truck Cab Design: Perceptions of Women Truck Drivers

## WiiT Paris 2014: Women's Issues in Transportation

5<sup>th</sup> International Conference on Women's Issues in Transportation- Bridging the Gap  
April 14-16, 2014 Paris – Marne-la-Vallee (France)



Dr. Jeanette Kersten, EdD  
University of Wisconsin Stout  
302B Jarvis Science Wing  
P.O. Box 790  
Menomonie Wisconsin, USA 54751-0790  
715-232-5229 office  
715-232-5236 fax  
[kerstenj@uwstout.edu](mailto:kerstenj@uwstout.edu)

Ellen Voie, CEO and President  
Women in Trucking, Inc.  
P.O. Box 400  
Plover, Wisconsin, USA 54467-0400  
888-464-9482 office  
715-341-9010 fax  
[ellen@womenintruck.org](mailto:ellen@womenintruck.org)

Matt Maurer, Graduate Student  
University of Wisconsin Stout  
Menomonie Wisconsin, USA 54751-0790  
[maurerm0490@uwstout.edu](mailto:maurerm0490@uwstout.edu)

Jane Palakeel, Graduate Student  
University of Wisconsin Stout  
Menomonie Wisconsin, USA 54751-0790  
[palakeelj@my.uwstout.edu](mailto:palakeelj@my.uwstout.edu)

William Chacon, Graduate Student  
University of Wisconsin Stout  
Menomonie Wisconsin, USA 54751-0790  
[chaconw4978@my.uwstout.edu](mailto:chaconw4978@my.uwstout.edu)



Abstract=254 words  
Paper with tables = 5215 words,  
excluding references  
Number of Tables = 17 tables

Author note:  
Dr. Jeanette Kersten, Department of  
Operations and Management, College  
of Management, University of  
Wisconsin-Stout.

Correspondence concerning this article  
should be addressed to: Dr. Jeanette  
Kersten, Department of Operations and  
Management, University of Wisconsin-  
Stout.  
Contact: [kerstenj@uwstout.edu](mailto:kerstenj@uwstout.edu)

### Abstract

The trucking industry is a major force behind the United States (US) economy with approximately 750,000 interstate motor carriers. Trucks deliver 70% of all freight tonnage while 80% of U.S. communities receive goods exclusively by truck. The motor carrier industry provides jobs, generating significant income and tax revenue, representing approximately 5% of U.S. Gross Domestic Product (GDP). Despite one of every 13 people employed in a trucking-related job, there is a significant driver shortage. The American Trucking Associations (ATA) currently projects a shortage of 20,000 to 25,000 drivers in the for-hire truckload market (ATA, 2012).

Women are well positioned to address this shortage. In 2011 women represented 7% of total employment in the U.S. trucking industry (Bureau of Labor Statistics, 2011). The purpose of this study was to identify truck design needs for women truck drivers. This research is significant due to limited data sources about truck design needs for women drivers. This study also contributes to the body of knowledge about women in the trucking industry. In response, a 33 question survey was developed using Qualtrics™ survey software. In April 2012, an electronic survey was distributed to 663 Women in Trucking Association members over a two week period with a response rate of 18%.

Results were separated into quantitative and qualitative data and analyzed accordingly. Adjustability was a central issue facing women truck drivers. Recommendations for seat design, side mirrors, steps, handrails, hydraulic hood lifters, and steering consoles will be presented. Limitations of the study and recommendations for future research will be discussed.

*Keywords: truck cab design, women truck drivers, trucking industry, needs assessment*

## Introduction

The trucking industry is a major force behind the United States (US) economy with approximately 750,000 interstate motor carriers. Trucks deliver 70% of all freight tonnage while 80% of U.S. communities receive goods exclusively by truck. The motor carrier industry provides jobs, generating significant income and tax revenue, collecting more than \$650 billion in revenue. This represents approximately 5% of U.S. Gross Domestic Product (GDP). Despite one of every 13 people employed in a trucking-related job, there continues to be a significant driver shortage.

A 2012 report by American Trucking Associations (ATA) currently projects a shortage of 20,000 to 25,000 of drivers in the for-hire truckload market in the U.S.A. (ATA, 2012). Deregulation of the motor carrier industry dating from the 1980s has been credited for increased growth of the industry and a demand for drivers (Beilock, 2005). According to the published literature, at least one fifth of all long-haul drivers are age 55 and older and it is expected that a larger percentage of long haul heavy duty truck drivers in the transportation industry will be older with within the next decade resulting in an increase in retirements (Bunn, Yu, Slavova, & Bathke, 2009).

The beneficial aspects of being a truck driver involve several aspects: independence, ability to make decisions, operation of new and better trucks, high income potential, and ability to explore and travel to different parts of the country (Johnson, Bristol, McClure, & Schneider, 2011). In terms of income potential for women truck drivers, the average starting median income can be upwards of \$30,000 annually USD (E. Voie, personal communication, February, 25, 2014). However, a review of the literature reveals wide variability regarding annual median incomes reported in the United States for women drivers as well as their male counterparts. A study by Stephenson and Fox, (1996) reported the average median income of drivers was approximately \$40,000 per year USD, while a study by Valway, Jenison, Keller, Vega-Hernandez, and McCree published regarding truck drivers (N=652) in New Mexico that the annual median income for women drivers was approximately \$50,000 per year USD versus \$61,000 per year USD for male drivers. The Bureau of Labor Statistics in 2012 reported the annual median income of women drivers was approximately \$ 27,924 per year USD with the annual median income of male drivers reported at approximately \$38,272 per year USD (BLS, 2012). Factors that may influence the reporting of annual median income data in the literature may be related to the hours or service regulation rules, anti-discrimination laws in the United States, and low reporting (V. Walker, personal communication, February 25, 2014).

Although these are attractions to the industry, truck drivers spend long hours behind the wheel, working an average of 41.5 hours per week (BLS, 2009a). Long hours, driver shortages, and challenging working conditions are related to the high turnover rates in the trucking industry compared with the overall labor force considered in its entirety (Stephenson & Fox, 1996; Beilock, 2005). Truck drivers are subject to hours of service regulations (HOS) by the Department of Transportation (DOT). These rules limit drivers to 60 hours of work time in 7 days and require an 8 hour break after 10 hours of driving and 15 hours of total work time (Belman & Monaco, 2001, p. 504). Such limitations impact the median income of drivers and may be a contributing factor regarding the wide range of variability in reported annual median income data among the truck driver population in the United States.

Although the research recommends the industry focus on scheduling greater home time, increasing pay and benefit packages, technology assistance with government paperwork requirements, driver skill and safety, as well as decreasing driver stress, there has been limited focus on the truck cab design needs for the trucking industry specifically focused on women (Johnson, Bristow, McClure, & Schneider, 2001). A well-designed truck cab not only makes a significant difference in the working conditions for a truck driver but also affects the safety of truck drivers and other road users. If the design of the truck cab is poorly fitted to the size and dimensions of the driver, the road may be less visible, driving controls may be more difficult to reach, and seat belts may be less comfortable and less likely to be used—all of which increase the risk of injury to the driver and other road users.

In 2011 women represented 7% of total employment in the U.S. trucking industry (Bureau of Labor Statistics, 2011). This new demographic reality necessitates an updating of the data used for the design of truck cabs because of the link to various demographic characteristics (Bradtmiller, Ratnaparkhi, & Tebbetts, 1985; Gordon, Bradtmiller, & Ratnaparkhi, 1986; International Organization for Standardization [ISO], 2006). Given the previous discussion regarding the continued driver shortage, there is a pressing need to enhance ergonomic cab designs for safe and efficient over-the-road operation, especially for women drivers. A 2012 study by Jinhua; Hongwei; Bradtmiller; Tsui-Ying; Reed; Jahns; Loczi; Hardee; and Piamonte, found that although male truck drivers were shorter in stature, female truck drivers were not different from the U.S. general population. Demographic evidence suggests that the population is changing, with a greater representation of racial and ethnic minorities, especially the Hispanic ethnic group. In 1983, the combined category of truck drivers (heavy and light) and driver-sales workers included 11.7% African Americans, 5.6% Hispanics, and 3.5% females (BLS, 1983). In 2009, the category of driver-sales workers and truck drivers included 13.4% African Americans, 18.7% Hispanics, and 5.2% females (BLS, 2009c). Improvements in the quality of the driver working environment, comfort, and driver experience are recommended to attract, retain, and enhance profitability for the industry (Stephenson & Fox, 1996). This study focuses on eliciting the perceptions of women truck drivers regarding the design and equipment needs and recommendations for Class 8 trucks. This study seeks to inform and add to this body of literature.

**Methods**

The study sample consisted of 663 female truck drivers who were members of the Women in Trucking (WIT) Organization, located in Plover, Wisconsin, U.S.A. Survey questions were designed based on available information from the literature, interviews with Ellen Voie, President for Women in Trucking, and an experiential assessment exercise evaluating a new 2012 Class 8 Model Truck and a used Class 8 Model Truck at a local dealership in March 2012. The survey was a component of an applied learning project for a graduate level course and was developed as an online survey using Qualtrics™ survey software. Data were collected were states across the continental United States. The survey used convenience sampling methods and was distributed to WIT members for a two week period in April 2012. Only those with a valid Class A Commercial Vehicle Driver’s License (CDL) were measured.

**Results**

A survey was developed using a 4 point Likert scale rating with an open ended question text boxes following each question option. Survey question design resulted from an experiential learning exercise with students in March 2012 using 1 new class 8 truck and 1 used class 8 truck as exhibits. Survey questions were formulated, edited, and reviewed by the President of Women in Trucking (WIT), course professor, and the students. The population sample was a convenience sample of the membership from the Women in Trucking (WIT) organization in a 2 week time frame in April 2012. The electronic survey was developed in Qualtrics and e-mailed to 633 WIT members with a resulting response rate of 122 or 18%. Questions 1 through 6 of this survey provide the demographics of the sample representing the quantitative portion of this study. The remaining questions and results of the survey are qualitative in nature and reported in terms of frequency with central themes and subthemes derived from the qualitative analysis with recommendations for truck cab improvement (Miles & Huberman, 1994). Limitations for future survey design and distribution will be discussed in the recommendations section.

**Quantitative results**

Table 1

*What type of truck do you usually drive?*

#	Answer	Response	Frequency %	Statistic	Value
1	Heavy Duty (Class 8)	101	89%	Min Value	1

2	Medium Duty	10	9%	Max Value	3
3	Light Duty	2	2%	Mean	1.12
				Variance	0.15
				Standard Deviation	0.38
	Total	113	100%	Total Responses	113

Table 2

*How long have you been driving this truck?*

#	Answer	Response	Frequency %	Statistic	Value
1	Less than 6 months	8	7%	Min Value	1
2	6 months to less than 1 year	7	6%	Max Value	5
3	1 year to less than 3 years	18	16%	Mean	4.04
4	3 years to less than 5 years	20	18%	Variance	1.59
5	5 years or more	60	53%	Standard Deviation	1.26
	Total	113	100%	Total Responses	113

Table 3

*How many hours/day do you spend driving this truck?*

#	Answer	Response	Frequency %	Statistic	Value
1	1-5 hours	6	5%	Min Value	1
2	6-10 hours	33	29%	Max Value	3
3	>11 hours	74	65%	Mean	2.60
				Variance	0.035
				Standard Deviation	0.059
	Total	113	100%	Total Responses	113

Table 4

*The cab of this truck is comfortable for your body type.*

#	Answer	Response	Frequency %	Statistic	Value
1	Yes	85	76%	Min Value	1
2	No	27	24%	Max Value	2
				Mean	1.24
				Variance	0.18
				Standard Deviation	0.43
	Total	112	100%	Total Responses	112

Table 5

*Do you feel safe when driving the truck?*

#	Answer	Response	Frequency %	Statistic	Value
1	Yes	105	92%	Min Value	1
2	No	9	8%	Max Value	2
		114		Mean	1.08
				Variance	0.07
				Standard Deviation	0.27
	Total		100%	Total Responses	114

Table 6

*Are you satisfied with how your truck handles while driving?*

#	Answer	Response	Frequency %	Statistic	Value
1	Yes	100	90%	Min Value	1
2	No	11	10%	Max Value	2
				Mean	1.1
				Variance	0.09
				Standard Deviation	0.3
	Total	111	100%	Total Responses	111

**Quantitative item analysis.** Tables 1-6 represented the quantitative results for this study. Of this sample, 88% or survey participants represented driving Class 8 (Heavy Duty) trucks with 10% driving Medium Duty trucks. Participants indicated they had been driving for 5 years or greater. Twenty nine percent of participants reported driving 6 to 10 hours per day while 65% indicated driving greater than 11 hours per day, representing a sum total of 94%. Seventy-five percent of respondents reported they were satisfied with their current truck and 92% of participants replied feeling safe while driving their truck on the highways, interstates, and byways.

**Qualitative results**

The remaining survey questions focused on the qualitative items of the survey by eliciting feedback about the issues that women face in terms of truck cab design of Class 8 Trucks. The questions were designed as open ended with a response section for recommendations for improvement in these areas. Central themes and subthemes were analyzed using qualitative coding methods to explicate frequency of these themes and subthemes (Miles & Huberman, 1994).

Table 7

*What could be improved in terms of safety of the truck?*

Central Theme	Frequency (%)	Subtheme	Recommendation
Seat belt adjustability	80%	Seat restraint systems built for women	Make seat belt adjustable
		Uncomfortable seats	Change the seat design
		Less flexibility in seat position	



Rotation	47%	Difficult to turn	to the driver Power steering standard for all trucks
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**Qualitative item analysis, Table 10.** Analysis of the results in Table 10 focused on the design and position of the steering wheel of the Class 8 truck. Analysis this question identified 3 central themes in the areas of: position, dimensions, and rotation concerning the steering wheel mechanism. In regard to steering wheel position, 58% of survey respondents identified the steering wheel design as uncomfortable and/or obstruction for viewing the truck dashboard. Fifty-two percent of respondents reported that the steering wheel design was too small with a recommendation of design sized with the driver. Rotation of the steering wheel was the third most common theme (47%). Respondents reported that the steering wheel mechanism was difficult to turn while driving.

Table 11

*Which of the following components of your truck pedals are you not satisfied with in terms of design?*

Central Theme	Frequency (%)	Subtheme	Recommendation
Adjustable Pedals	77%	Material	Non slip material (design)
		Design	Wider pedals
		Adjustability	Adjustment for short and long legged people
		Positioning	Placement of clutch Wider pedal area

**Qualitative item analysis, Table 11.** Table 11 focused on the adjustability of the foot pedals for Class 8 truck. Adjustability of foot pedals was a central theme and concern of study participants (77%). Subthemes identified were: adjustability, materials used for foot pedal design, position, and overall design of the pedal were problematic for women drivers. Study participants recommended opportunities for improvement in areas of: non slip materials, wider design, pedal adjustability, and overall design regarding clutch placement.

Table 12

*Which of the following components of your truck's cabin facilities are you not satisfied with in terms of design?*

Central Theme	Frequency (%)	Subtheme	Recommendation
Mattress and cabin Space	60%	Better mattresses	Higher quality mattresses, Bigger and comfortable
Bunk	42%	Quality	Bunk versatility Increased cabin storage Space Better carpet Softer cushions
Storage Facilities	36%	Lack of space for equipment	A larger bunk Microwave placement More storage space Drawers that pull out



**Qualitative item analysis, Table 12.** Table 12 focused on the perceptions of women drivers in terms of the cabin facilities of Class 8 trucks. Survey respondents identified the following central themes related to satisfaction levels: mattress and cabin space (60%), bunk design (42%), and storage facilities (36%). Survey respondents recommended opportunities for improvement in the areas of: mattress quality, increased and adjustable storage space, versatility, comfort, and other amenities.

Table 13

*Which of the following components of your truck's transmission are you satisfied with in terms of design?*

Central theme	Frequency (%)	Subtheme	Recommendation
Ease of Use	86%	Exactness of shifting	Easier and smoother gear transition
Location	42%	Location of gear shifter	Automatic Transmission Adjustability
Clutch	35%	Reachability	Better location of clutch Adjustability

**Qualitative item analysis, Table 13.** Table 13 focused on the perception of women truck drivers in terms of Class 8 transmission design. Central themes identified were: ease of use (86%), location (42%), and clutch (35%). Analysis of qualitative responses yielded the following subthemes: exactness of shifting capability, location of gear shifter, and the reachability of the clutch. Opportunities for design improvements that were associated with these themes and subthemes were: easier and smoother shifting and gear transition, options for ordering automatic transmissions and/or having manufacturers make automatic transmissions standard design features, and adjustability of the gear shifter. Survey participants recommended better locations for clutch placement and adjustability to better meet the design needs of women truck drivers.

Table 14

*Which of the following components of your truck's instrument console are you satisfied with in terms of design?*

Central theme	Frequency (%)	Subtheme	Recommendation
Dashboard	69%	Reachability	Slanted and contoured dash design
Lighting	59%	Lighting	More Lights on and in dash Back Lighting Better light on top of cabinets
Cabinets	39%	Reachability	Cabinets doors instead of Stretched mesh material

**Qualitative item analysis, Table 14.** Table 14 focused on the perception of women truck drivers related to truck instrument console design. Central themes identified were related to: dashboard (69%), lighting (59%), and cabinets (39%). Reachability was the primary subtheme for respondents for dashboard and cabinetry. Survey respondents recommended opportunities for improvement for instrument console design in the areas of dash design, improved lighting options, and the availability and reachability of cabinet doors that open and close, rather than the industry standard of stretchable mesh materials.

Table 15

*Which of the following components of your truck's engine accessibility are you satisfied with in terms of design?*

Central theme	Frequency (%)	Subtheme	Recommendation
Fuel tank accessibility	74%	Pump handle jumping Fuel spills	Ergonomic dash design
Ease of lifting hood	50%	Weight of hood (heavy) Hood latches (difficult)	Top of the dash too slanted
Ease of closing hood	43%	Visibility Weight of hood (heavy) Hood latches (difficult)	More lights in dash Back lighting Better light top cabinets

**Qualitative item analysis, Table 15.** Table 15 focused on women truck drivers in regard to perceptions about accessibility to the Class 8 engine compartment. Central themes identified were related to: access to the fuel tank (74%), ability of lifting the truck hood (50%), and ease in closing the truck hood (43%). Subthemes identified were: the jumping of the pump handle when fueling which precipitated the potential for fuel spills, heavy weight of the truck hoods, difficulty in closing truck hood latches, and reduced visibility. Analysis of recommendations for improvement related to truck design were: develop a more ergonomic dash design, additional lighting to improve visibility, and materials to address the weight and difficulty in the opening and closing of the truck hood.

Table 16

*Which of the following components of your truck's side mirror are you not satisfied with in terms of design?*

Central theme	Frequency (%)	Subtheme	Recommendation
Side mirror size	31%	Difficulty to get the complete view Too narrow to see the tail of the trailer	Design-longer and wider (e.g. West Coast mirror design)
Side mirror adjustability	28%	Limited adjustability	Electrical adjustment

**Qualitative item analysis, Table 16.** Table 16 depicted the feedback from survey respondents regarding side mirrors. Size mirror size and adjustability were the central themes identified. Survey respondents reported that size mirrors were too small, narrow, and/or lacked adjustability. Opportunities for improvement included designing longer and wider mirrors including the ability of electrical adjustment, similar to standard passenger vehicles.

Table 17

*Which of the following components of your truck's accessibility are you not satisfied with in terms of design?*

Central theme	Frequency (%)	Subtheme	Recommendation
Step spacing	37%	Difficult to reach the cab floor due to spacing	Have one more step  Steps made close together
Step width	48%	Steps too narrow	Wider steps-especially top step
Handrail location	44%	Slippery handrail material	Return to Century design for more accessibility
Handrail availability	50%	Safety concerns due to loss of grip while climbing Difficulty getting into the truck due to lack of handrail(s)	Handrail inside the truck Increase the number of handrails

**Qualitative item analysis, Table 17.** Table 17 explicated the perceptions of survey respondents regarding accessibility to the truck cab. Step spacing (37%) and step width (48%) revealed challenges women truck drivers face on a consistent basis. Subthemes identified spacing between steps in general and for entrance into the truck cab were too wide of a distance for women drivers. The second subtheme indicated that steps were too narrow for proper foot placement. In addition, the topic of handrail availability and location were prominent central themes for participants in this study. Respondents recommended the additions of steps and handrails. Wider steps and availability of the number of handrails and inclusion of handrails within the truck cab were also recommended as opportunities for improvement.

### Discussion and Recommendations

In this study, no differences were found in survey answers between drivers taller than 5' 6" and drivers shorter. Therefore, height of participants was not a limiting factor. For the most part, survey participants in this study were satisfied with their trucks. This study focused on eliciting the perceptions of women truck drivers regarding the design and equipment needs and recommendations for Class 8 trucks. This study sought to add to this body of literature. The analysis tells us that most of the design issues could be remedied if various aspects of Class 8 trucks were made to be more adjustable.

As a result of this pilot study, the following recommendations regarding specific design aspects of Class 8 trucks. These are based on items that were repeatedly identified by the study participants, who were truck drivers and members of the Women in Trucking (WIT) organization.

1. *Seat adjustability.* Participants in this study recommended increasing the adjustability of the seat style and mechanism for the Class 8 truck. General recommendations by survey participants were in the categories of: adjustability, increased lumbar support, shock absorption of the truck seat to accommodate bumps and road conditions. Specific recommendations in terms of adjustability included designing seatbelts that are adjustable to fit all body types, changing the seat design for positioning to fit women drivers, and increase leg capacity and space under the steering column. Lastly, study participants recommended manufacturers include airbags as a standard design feature.

2. *Adjustable steering wheels.* Study participants recommended that adjustable steering wheels be included in the overall design or as an option for purchase when selecting a Class 8 truck. In addition, increasing the current adjustability features of the steering wheel were also a primary recommendation. Study participants consistently reported positive comments about the tilt steering wheels in the current trucks driven by participants in this survey. Study participants in this survey suggested the involvement of women truck drivers in the design phase of steering wheels at the time of manufacture. In addition, participants recommended truck manufacturers and distributors allowing greater decision making and choices in terms of size and placement of the steering wheel during the purchasing process.

3. *Adjustable foot pedals.* Participants in this study recommended a review of the adjustability of the pedal mechanisms. Study participants also recommended manufacturers review the raw materials used during the manufacturing process and select materials to make the pedals less slippery in times of inclement weather. Suggestions were also made to widen the space between pedals, specifically the clutch mechanism.

3. *Increased truck cab lighting and comfort.* Study participants recommended improvements in the areas of lighting, storage facilities, and comfort. Recommendations included but were not limited to the following: 1) increasing the number and types of lights in the truck cab and sleeper compartments; 2) increasing the storage and accessibility of storage; and 3) improving the quality, comfort and size of the mattresses in the sleeper compartments.

4. *Easy access engine compartments.* Accessibility of the engine compartment was a design priority for women truck drivers in this study. The weight of the truck hood and difficulty closing hood latches were specific concerns identified in this study. Study participants recommended accommodations in the ergonomic design of the hood and engine compartments. The recommendations included: 1) attempts to decrease the overall weight of the hood in the manufacturing process considering lighter materials without compromising quality and durability; and 2) use of hydraulic lifters for easier opening and closing which would accommodate all body types; and 3) increased lighting within the engine compartment area. Study participants also recommended manufacturers consider automatic transmissions as a standard design option for Class 8 trucks.

5. *Adjustable side mirrors.* Survey participants recommended increase adjustability of the side mirrors for the Class 8 truck design. Increased adjustability of side mirrors is recommended for good sight lines toward the rear of the truck. This would improve the safety for the driver in handling the truck during normal operations. In addition, longer and wider mirrors to view the end of the tractor trailer would improve safety and handling of the truck and also increase efficiency and maneuverability by truck drivers.

6. *Step spacing and width.* Study participants provided recommendations in terms of the design and width of the steps exiting the truck compartment. Specific recommendations for manufacturers based on this study included: 1) widening the top step for exiting the truck cab compartment to provide a wider platform base and improve safety for drivers exiting the compartment. 2) Decreasing the width between steps to accommodate operators of shorter stature and stride capacity. This would reduce safety risks and fall potential.

7. *Handrails.* Study participants also suggested the availability of handrails externally. Participants stated that handrails were not standard equipment for some Class 8 trucks. Including handrails inside the truck cab were also recommended to avoid slipperiness in times of inclement weather. Survey participants also suggested increasing handrails in areas where climbing may be a necessity.

### **Conclusions**

This study found that there were no differences in the responses from people above 5' 6" tall and those that are below 5'6" in height. Adjustability was the primary theme and recommendation from the WIT respondents. While study participants were primary female in terms of gender, the common themes of this study apply to all gender types. Study participants indicated issues with the placement, adjustability, and size of at least

one or two items in their trucks. A positive qualitative finding of the survey participants was the overwhelming response to tilt steering. This furthers the study’s assertion that flexibility and adjustability are necessities for women truck drivers regarding the design of Class 8 trucks. Including truck drivers in cab compartment design at the manufacturer level would be beneficial for the potential driver, brand loyalty, manufacturers, and the trucking industry in general. Allowing choices regarding adjustability and providing options for accessories for prospective truck drivers at the time of lease or purchase is also recommended.

**Limitations of the study**

This study experienced limitations in terms of study design and duration. This study was limited in terms of time and experience level of researchers. This study was part of an applied learning project as a component of a graduate course at a University in the Midwest (United States). Therefore, challenges were experienced due to the nature of this learning environment. There was a noted design error in question design and formatting which was discovered after initial survey distribution. This resulted in a delay in survey deployment, limited responses, and delayed data collection. Although the student researchers corrected the survey design error, this impacted the overall duration of survey availability to study participants which limited the number of responses and resulted in an 18% response rate. In addition, the survey was deployed in April 2012 at the time of a readily observed holiday. Data analysis was impacted due to end of semester deadlines for course work in the university setting.

**Recommendations for further study**

Despite the limitations of this pilot study, significant and relevant information was obtained that provide the foundation for further study and future research. The following suggestions are recommended for future consideration.

1. Redesign the survey to include more detailed survey logic and deploy the survey over a longer duration of time.
2. Include a larger sample for analysis. This study had 122 responses with some questions reporting 113 responses out of a total of 663 surveys distributed. Distributing the survey over a longer duration and/or multiple replications of this survey would yield more reliable data for analysis.
3. Include survey constructs and questions that collect a wider demographic data set, such as: age, gender, medium income, etc. to allow for increased analysis against industry trends and BLS data.
4. Partner with National Institute of Safety and Health (NIOSH), truck manufacturers, and representatives in the trucking industry to create a validated survey construct. It is recommended that focus groups and additional survey measures be considered to validate survey questions to improve the reliability and validity of this survey instrument.
5. As a result of recommendation item 4, revision and redistribution of the survey to a pilot group or other transportation organizations is recommended prior to wider distribution of the survey.

6. Include questions specifically focused on the topic of recruitment of women into the truck driving industry as well as questions designed to elicit feedback on retention of women in the trucking industry would be beneficial for further study.
7. Continued partnership with the Women in Trucking (WIT) organization regarding the presentation and distribution of the results of this study to inform truck manufacturers and carriers about the cab design challenges women drivers experience.
8. Continued partnership with Women in Trucking (WIT) and the University of Wisconsin-Stout to develop a user guide for equipment purchasing specifically focused on women truck drivers.
9. The Women in Trucking (WIT) organization will offer member companies and sponsors of the Women in Trucking organization the results of this study in an effort to assist in redesigning the specifications of new trucks and retrofitting of existing trucks with a focus to align with the results, findings, and recommendations of this study.

Women are an untapped resource to consider in addressing the current driver shortage in the industry. Improvements in the quality of the truck driver environment are recommended to be a high priority for every trucking company for the recruitment and retention of women truck drivers. There is a pressing need to enhance ergonomic cab designs for safe and efficient over-the-road operation for women truck drivers. In addition, there has been limited focus on the truck cab design needs for the trucking industry specifically focused on women. This study seeks to inform the body of literature regarding the truck cab design needs based on the feedback and perceptions of women truck driver members of the WIT organization. At the time of this publication, Ryder System, Inc. <sup>TM</sup> has expressed interest in the results of this pilot study.

### **Acknowledgements**

The University of Wisconsin, Stout would like to thank Ellen Voie, CEO and President of Women in Trucking and the members of the Women in Trucking (WIT) organization for their advocacy of women, participation in this applied research project, and the support of the applied learning and research process.

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