



CPSC Staff's Statement on Westat, Inc.'s Report,  
"User Acceptance and Effectiveness of Seat Belt Speed Limiters  
on Recreational Off-Highway Vehicles—Phase 2: Field Test Focus Group"<sup>1</sup>  
February 2015

The report titled, "User Acceptance and Effectiveness of Seat Belt Speed Limiters on Recreational Off-Highway Vehicles—Phase 2: Field Test Focus Group," presents the findings of field test focus groups conducted by Westat, Inc., under Contract CPSC-D-12-0002, Task Orders 0001 and 0002. Westat conducted the field test focus groups for CPSC's notice of proposed rulemaking (NPR), to address user acceptance of a seat belt speed limitation system at different maximum speed limits. The CPSC NPR proposes that the speed of an ROV be limited to 15 mph if occupied front seat belts are not buckled. The objective of Phase 2 of the Westat study is to provide data on ROV users' acceptance of a seat belt speed limitation technology with threshold speeds of 10 mph, 15 mph, and 20 mph, respectively.

Westat recruited 34 participants and conducted field test focus groups in three different geographic locations in the United States: (1) Emmitsburg, MD; (2) Beckley, WV; and (3) Ocotillo Wells, CA. Group discussions occurred before and after the field trial task and focused on user behavior regarding seat belt use. The field trial allowed the participants to drive an ROV and experience the vehicle's speed limitation system under a variety of speed settings while performing a task. The task consisted of driving the ROV to a set point, exiting the vehicle to retrieve a golf ball off of the ground and then driving the vehicle back to the starting point. The participants drove the speed-limited ROV at 10 mph, 15 mph, 20 mph, and at a self-selected speed limit while performing this task. Continuous vehicle speed data was collected for each run using on-board instrumentation.

After each pass, the participant was asked questions aimed at measuring acceptance, annoyance, usability, preferred options, etc. After the field portion was complete, participants took part in a follow-up discussion with a more detailed analysis of acceptance, usability, preferred speed options, improvements, etc.

The attached report describes the test methodology, data collection procedures and the findings from the study.

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<sup>1</sup> This statement was prepared by the CPSC staff, and the attached report was produced by Westat for CPSC staff. The statement and report have not been reviewed or approved by, and do not necessarily represent the views of, the Commission.

Contract # CPSC-D-12-0002

# **User Acceptance and Effectiveness of Seat Belt Speed Limiters on Recreational Off-Highway Vehicles - Phase 2: Field Test Focus Group**

## **Final Report**



**January 19, 2015**

**Submitted to:**  
Consumer Product Safety  
Commission

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## 1.1 Background

Recreational Off-highway Vehicles (ROVs) are motorized vehicles designed for off-highway use. These vehicles are characterized by having four or more pneumatic tires designed for off-highway use; bench or bucket seats for two or more occupants; automotive-type controls for steering, throttle, and braking; and a maximum vehicle speed that exceeds 30 miles per hour (mph). Although these vehicles lack the protection of a closed environment and other safety features, such as airbags, that are common in traditional on-road passenger vehicles; ROVs are equipped with rollover protective structures (ROPS), seat belts, and other restraints such as doors, nets, and shoulder barriers to protect vehicle occupants.

Although ROVs and All-Terrain Vehicles (ATVs) are similar in that both are motorized vehicles designed for utility and recreational purposes off-highway; ROVs differ significantly from ATVs in its overall vehicle design. ROVs have a steering wheel rather than a handle bar; foot pedals instead of hand levers for throttle and brake control; and bench or bucket seats rather than seating that requires the occupant(s) to straddle over top. Most notably, ROVs only require steering wheel input from the driver to direct the vehicle. Conversely, ATVs require riders to use both their hands and body to direct the vehicles and maintain the ATV's pitch and lateral stability.

Many ROVs have the capability of operating at relatively high speeds (some having the capability to go faster than 60 mph) on a wide variety of terrains resulting in a potential for loss of vehicle control and stability, thus increasing the risk of an incident. Occupant restraint systems are designed to mitigate the effects of such incidents by preventing occupant ejection, impact with vehicle surfaces, and impact with the ground or environmental objects. Although occupants are encouraged to use seat belts and helmets, these safety features require an intentional act on the part of the user.

As of April 5, 2013, CPSC staff cited 550 reported ROV-related incidents that occurred between January 1, 2003 and April 5, 2013; of these there were 335 reported fatalities and 506 reported injuries related to the incidents (CPSC September 24, 2014 Briefing Package). Information from fatality and injury cases indicate that full or partial ejection is common and most victims are not wearing seat belts at the time of the incident.

The degree of seat belt use in the general population of ROV users is unknown, but the injury and fatality cases suggest the need for improved belt use rates in this at-risk population. Additionally, the population of ROV users may be more reluctant than the general population to use protective devices, and usage patterns (e.g., short runs, frequent stops) may also discourage habitual seat belt use.

Various strategies have been proposed to encourage increased use of protective devices. In the seat belt domain, there has been experimental evaluation of seat belt delay systems, which impose some time interval between ignition and the ability to place the vehicle in gear unless the driver's seat belt is buckled. Among such vehicle response strategies is the concept of a speed limiter. Such a system does not prevent vehicle motion, but limits the speed to some ceiling level if the occupant is not wearing a seat belt. This is the strategy that has been adopted by one ROV manufacturer (Bombardier Recreational Products) on their Commander 1000 and Maverick 1000 models and may be feasible for broader ROV application. Another ROV manufacturer (Polaris Industries) has stated that most of their Model Year 2015 ROVs will adopt a seat belt speed limiting system as well.

## **1.2 Objectives**

There is an inherent trade-off between the effectiveness of a seat belt use motivational device in changing driver behavior and the willingness of users to purchase vehicles with the device. The objective of this project is to provide CPSC with systematic and objective data to support agency decision making with regard to ROV restraint system requirements related to seat belt speed limiter technology. In order to accomplish this, CPSC must understand the use patterns of ROV riders as well as when and where they might use a seat belt. In addition, the agency must understand the potential effectiveness of this particular countermeasure, user acceptance issues, and system features and parameters that might maximize benefits.

## **1.3 Approach**

Overall, the study objectives were accomplished in a two-phase approach. In Phase 1, Westat conducted several conventional focus groups aimed at gathering user experiences and opinions regarding their current ROVs as well as user opinions regarding the incorporation of speed limiter

devices on ROVs that they might purchase in the future. Participants reported driving the vehicles frequently for a variety of reasons on both public and private properties. Although all participants indicated that their ROV was equipped with a restraint system, most admitted to being part-time users, and restraint use was often related to the circumstances under which they were using the ROV, and perceived risk of injury. Typically, their decisions to use a restraint system were based on type of terrain, speed of vehicle, and presence of other passengers (particularly children). However, most participants felt that based on their use patterns and level of experience with ROVs, there was no need for them to use a restraint system. In addition, their opinion of the speed limiter was very negative. Participants felt that having a limiter linked to the restraint system was unnecessary for most riders. The feature would interfere with their accomplishing goals or chores; requiring the driver to latch and unlatch the restraint system unnecessarily under most conditions where the perceived risk of injury is minimal. Conversely, most participants indicated that the feature would be beneficial for younger or novice drivers with little experience and over confidence.

Phase 2, involved a more hands-on interaction with the technology to provide a more ecologically valid evaluation of the technology and its functionality. This phase included a component where participants are allowed to experience the Commander 1000 and the speed limiter technology. This task examined participants' responses (whether behavioral or subjective) under a prescribed set of conditions of ROV use. Once the driver had an opportunity to drive the ROV, with and without the speed limiter activated, participants shared their opinions in a small focus group setting that allowed for a discussion. The topics addressed included:

- Seat belt usage, under various conditions and reasons for use/nonuse
- ROV seat belt speed limiter acceptability
- Acceptance by particular user groups
- Reasons for acceptance or non-acceptance
- Usability considerations
- Effects on speed, usage patterns
- Revisions to the design that would make it more acceptable (increasing speed threshold, multiple customized ignition keys, presence of a key switch)
- Strategies by which the speed limiter might be disabled or bypassed
- Circumstances under which the speed limiter would be unacceptable

This provided the opportunity to address the gaps in the current knowledge related to understanding the driver use patterns for ROVs and seat belts, the potential effectiveness of this particular countermeasure strategy, user acceptance issues, and system features and parameters that would maximize benefits while maintaining safety. The remainder of this report outlines the overall methodology implemented to achieve the project goals as well as findings and conclusions from Phase 2 of this study.

## 2.1 Overall Study Design

Focus groups were conducted in Emmitsburg, Maryland, Beckley, West Virginia, and Ocotillo Wells, California. The introduction indicated federal government sponsorship and described the intent of the focus group to explore the feasibility of using restraint system requirements related to seat belt speed limiter technology in all recreational off-road vehicles. A moderator's guide was used (see Appendix A) which provided explicit procedural details for all aspects of the focus group, including a specific question path and associated scripting. The focus group was approximately 1½ hour in duration, and was audio taped for review and analysis.

Upon arrival participants (usually in groups of two or three per session) were consented and a brief discussion took place which included the participant's typical riding habits and seat belt usage. Discussion questions about riding habits included: the type of riding usually engaged in (recreational and/or work), average estimated speed, the typical terrain traveled on, and how the different terrains are handled.

Following this initial discussion, participants were invited to drive the ROV and experience the speed limiter under a variety of settings while performing a task. The task was similar to the circumstances identified in the Phase 1 focus groups as having low perceived risk of crash and injury. In addition, based on feedback from the conventional focus groups (Phase 1) a need to look into participants' opinions regarding a speed limiter with a trigger at a slightly higher speed than the current setting of 9 mph was identified. Participants completed the hands-on portion individually, and were not allowed to watch other participants complete the task. The test course allowed participants to experience the route four times under different speeds and restraint use conditions.

Prior to the first pass, participants were allowed to drive the ROV for a few laps to familiarize themselves with the vehicle and get a feel for how it handled. After each pass the participant was asked questions aimed at measuring acceptance, annoyance, usability, preferred options, etc. After the field portion was complete, participants took part in a follow-up discussion with a more detailed analysis of acceptance, usability, preferred speed options, improvements, etc.

Study participants were compensated \$75 for their time.

## 2.2 Participant Recruitment

Given that the objective of the project was for CPSC to understand the use patterns for ROV's and seat belts, the potential effectiveness of this particular countermeasure strategy, user acceptance issues, and system features and parameters that would maximize benefits while maintaining safety, the resources of this project would not be best served by addressing the general population of ROV riders or ROV riders who use their seat belt all the time.

Recruitment efforts strongly considered the fact that any public policy effort to understand and influence the use of seat belts by ROV riders must explore the behavior and opinions of part time belt users and non-users. Full-time ROV belt users will experience essentially no change by the presence of the seat belt speed limiter technology. Therefore, we placed a heavy emphasis on targeting those riders whose behavior will be affected by its presence in order to obtain a better understanding of their opinions and its potential effectiveness as a countermeasure.

Potential participants were recruited and screened based on the following factors that emerged from Phase 1:

- Part time belt users and non-belt users
- Different groups of ROV users (BRP Commander 1000, Polaris Razor, Kawasaki Teryx, Yamaha Rhino and others with similar performance and design characteristics [e.g., capable of traveling over 30 mph])
- Riders with different use patterns (farm or ranch work, off-road recreation, hunting, commercial or military, and other applications)
- Riders that ride alone and those who ride with groups.

To help achieve a representative population of ROV users, Field Test Focus Group sessions were conducted in three different geographic locations in the U.S with varying topography. Focus groups were conducted in Emmitsburg, MD, Beckley, WV, and Ocotillo Wells, CA. A more detailed description of each area is presented in Section 3.2.2 of this report.

As with Phase 1, recruiting this population was challenging, and therefore, a variety of recruitment strategies were employed in each area. To better reach the target population, participants were

primarily recruited through the Maryland Motor Vehicle Administration (MVA). The Maryland MVA requires ATV owners to register their ATV. Based on information received from the CPSC, it was assumed that registered owners of an ATV were also likely to own or use an ROV.

Through a cooperative agreement with Maryland’s MVA, participants were recruited in Frederick, Montgomery, Howard, and Carroll Counties in Maryland. The MVA generated a random owner sample from the Frame of ATV owners for recruitments. The MVA contacted the owner sample through a mailed letter which briefly described the study and indicated that interested parties could contact the research team to further discuss the study and their potential participation.

In the other States other means of recruitment were used. Participants were recruited at riding trails, ROV dealerships and repair shops, and on ROV riding group websites and forums. Ads or flyers were posted at these locations providing a brief description of the study and contact information for interested parties. Once interested drivers contacted the research team in response to the advertisements or the MVA letters, they were administered a brief screener that collected information on age, gender, whether or not they possessed an ROV, their riding practices, and whether or not they frequently use a seat belt when driving the ROV.

## 2.3 Participant Sample

Two or three participants were recruited for each session. A total of 34 participants were enrolled in the study (11 Females and 23 Males). While this is a very difficult population to identify and recruit, female riders and riders under the age of 30 were particularly challenging. However, every effort was made to recruit and schedule a balanced number of participants with respect to age and gender. A majority of the younger rider population was recruited in West Virginia. The mean age for female and male participants was 38.1 years and 44.7 years, respectively. Table 2-1 provides an age and gender summary breakdown of all participants by location.

**Table 2-1. Participant Demographics**

Location	Age Range	Mean Age	# of Male Participants	# of Female Participants	Total # of Participants
Emmitsburg, MD	30-90	53.8	7	1	8
Beckley, WV	19-60	33.1	11	7	18
Ocotillo Wells, CA	25-71	52.8	5	3	8

In general, participants recruited in California and West Virginia tended to ride their ROVs primarily for recreation, whereas the participants recruited in Maryland tended to use their ROVs for utility purposes like tasks or chores on their property, such as farm work and hauling items. In addition, recreational riding seemed to be linked to higher seat belt usage, whereas farm work and tasks that would require the rider to frequently get on and off the ROV were associated with claims of lower belt usage. Similarly, while performing tasks participants often indicated that they generally drive slower, usually less than 20 mph, than they would if they were out riding for recreation.

## 3.1 Focus Groups

Group discussions took place with participants both before and after the field trial task.

The discussions before the field trial focused on overall driving behavior, modifications made to their vehicles, and seat belt use. Topics included the type of riding each participant engaged in (recreational and/or utility based) and the typical terrains that the participant usually rode on, including the surface (snow/ice, grass, mud, sand, gravel, rocks, dirt, etc.) and the slope (mountain sides, sand dunes, flat areas, up and down, or along the side) was addressed. During these discussions participants were asked how they handled different terrains, including maneuvers they might make. Prior to the field task participants were also asked about their seat belt use and the belt use of their passengers. Part time users were asked about the criteria for choosing to wear the belt, as well as reasons why participants choose not to wear their belt. In addition to discussing belt use we asked how likely they felt they were to get into a crash, and whether or not the seat belt may provide protection during a crash.

Following the hands on portion of the field task, the discussion primarily focused on the task the participants were asked to perform, and their opinions on the seat belt speed limiter, the selected speeds, and whether it impacted their ability to perform the task. During this discussion participants were asked if they had a preferred speed for the limiter as well as other suggestions on how to improve this technology. In addition, participants were asked about their willingness to accept the speed limiter, and whether they would make an attempt to disable or by-pass the system.

## 3.2 Field Trial

The field trial was designed in order to simulate the conditions under which the participants in Phase 1 indicated that they would not use a seat belt. The condition was designed to minimize the perceived risk of crash and injury, and require the driver to travel relatively short distances before they needed to get out of the vehicle. The field trial involved each participant making multiple trips

through a fixed circuit that included three stations where they were required to leave the vehicle, perform a task, and then return to the vehicle to move on to the next station.

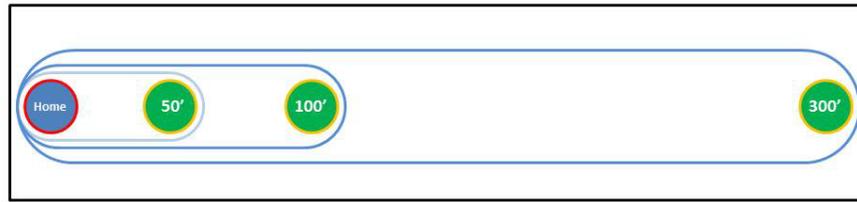
In total, the participant completed four complete trips through the circuit. For the first complete trip, each participant was required to wear their seat belt and allowed to select their own speed (under 30 mph) when completing the task. After completing the trip through all three stations, the parameters under which the participant was allowed to go through the course were changed. That is, whether or not they are required to wear the seat belt and which of the speed limiter settings (10, 15, or 20 mph) they experienced. For the second trial, participants experienced the speed limiter close to the manufacturers' current setting (10 mph). The third and fourth trials engaged two alternative speeds limit settings (15 and 20 mph) that were selected because most participants in the Phase 1 focus group felt that 15-20 mph may be a speed at which they would consider wearing a restraint.

The four passes (trips) are described in detail below:

- Pass 1: The participant was instructed to wear the seat belt and drive the ROV at a speed of choice but less than 30 mph.
- Pass 2: The participant was unbelted and the speed limiter was set to 10 mph, simulating a speed limiter similar to the current setting on the Can-Am Commander 1000.
- Pass 3: The participant was unbelted and the speed limiter was set to 15 mph, simulating a speed limiter set to a higher threshold.
- Pass 4: The participant was unbelted and the speed limiter was set to 20 mph, simulating a speed limiter set to a higher threshold.

The circuit was comprised of several “stations” separated by 50 ft, 100 ft, and 300 ft. Pilot testing was performed to determine the exact separation distances. The intent was to select separation distances that might be representative of various utility tasks that owners might encounter in the use of their own ROVs. Figure 3-1 depicts the course configuration. Each of the circles represents the distance from the home location to a station. The ovals surrounding the circles represent the path that the ROV traveled to reach and return from each station to complete the drives for each speed/seat belt configuration.

**Figure 3-1. Course Configuration**



Participants were asked to retrieve a golf ball from each station and then bring it back to the home station, which was their original starting point, then proceed on to the second station and so on. Each station in the circuit was marked by a hula-hoop, parking cone, and a bucket with golf balls.

The intent of each individual trip to a station and back is to provide some level of variability in the length of the trip and the relative impact of the lost speed triggered by the speed limiter when a seat belt is not used. By providing three levels of speed limited travel (i.e., 10, 15, and 20 mph) and one condition in which they must use the seatbelt, but travel at any speed they elect to drive under 30 mph, it is anticipated that participants will identify differences in the acceptability of the various speed and seat belt constraints.

Before any participant began the hands-on trial, an experimenter provided a short orientation briefing about the key controls on the ROV (e.g., gas, brake, seatbelt, gear shift) and the purpose and format of the trials (see Appendix B for the Experimenter Script). Participants were also provided with the following instructions and video demonstration:

“Ahead of you are a set of different stations that you will drive to. Each station is marked by a hula-hoop and cone. At each station there are golf balls in a bucket. At the station, we want you to completely exit the ROV, retrieve the golf ball, return back to the ROV, and then drive back to your starting point, where we would like you to exit the ROV, and deposit the golf ball in the bucket.

Then we want you drive to the next station, exit the ROV, get a golf ball, return to the starting point, exit the ROV and drop the golf ball in the bucket. You will do this until you have visited each station and retrieved all of the golf balls. Please watch this video for a demonstration of the tasks. We want you to perform this retrieval task for total of 4 different times under different conditions. Make sure you remember to put the ROV in park each time you stop to exit the vehicle!”

No discussions occurred between participants that had experienced the hands-on task and those who had not until all had finished the field task. Each participant experienced all the conditions while accompanied by a seat belted experimenter to ensure that all trials are performed safely. The

experimenter had the ability to terminate a given trial or subject if the subject or vehicle behavior suggested an unsafe situation. In addition, the experimenter and all participants were required to wear a helmet when operating the ROV.

After all participants experienced the hands-on portion of the focus group, they returned to the meeting space for a face to face discussion on what they experienced.

### **3.2.1 Instrumentation**

Instrumentation for this study included both speed control and speed data collection functionality. Speed control allowed demonstration of the various speed thresholds by an accompanying experimenter. The data collection function was designed to document the speed conditions and characteristics under which each participant experienced the ROV and its speed limitation settings.

#### **Speed Control**

Three devices were used in combination to control speed for each trial. These were:

- Use of a mid-range speed limiting key provided by the manufacturer
- Use of an adjustable block placed under the accelerator pedal
- Use of an electronic switch to instantly cut power to the throttle

The Commander was supplied with three keys, each with a preset speed range available during its use. The orange key allowed about 25 mph, the gray key allowed about 45 mph, and the black key allowed the ROV's top speed (reported to be above 65 mph) to be attained. The mid-range key (45 mph) was selected for use during the field trials because it provided adequate speed capacity to satisfy the fastest speeds allowed during the hands-on portions of the trials (i.e., ~30 mph) and acceleration on par with the black key.

Second, CPSC engineers installed an adjustable aluminum stop block on the accelerator pedal. This block used a bolt and jam nuts to lock the range of pedal motion. The test engineer adjusted the bolt position on the block to allow for an approximation of each of the speed limiter thresholds set during the hands-on trials. The bolt setting was locked in place with jam nuts each time it was adjusted for one of the three speed limit thresholds (10, 15, and 20 mph) during each trial.

The last aspect of the speed control involved activation of the ROV's built in speed limitation capability as the ROV approached the target speed (10, 15, or 20 mph). This last measure was accomplished by electrically disconnecting the driver's seat belt with an experimenter-controlled button while the belt itself remained buckled behind the driver's back. This mechanism caused the ROV to momentarily slow down because the ROV's electronic control unit sensed that the driver's seat belt was unbuckled, and sent a signal to the throttle body to reduce the vehicle's speed.

## **Data Collection**

The data collection aspect of the study was intended to document the conditions and characteristics of each participant's experience within a given speed limit, distance, and belt condition. Each session was video-recorded using a GoPro camera mounted on the ROV hood and aimed at the driver's face. Participant comments were transcribed and documented as part of the focus group findings. In addition to the video recordings, a tablet PC with a custom data collection application and attached GPS sensor collected data on the speeds achieved/chosen during each trial. The experimenter was able to designate the course length, belt, and speed limitation condition of each participant's trials in the application and then record 1Hz samples of speed, location, and heading data with those conditions annotated for later tabulation and analysis. The experimenter was able to see feedback of speed on the PC during the trials, but the update rate was less responsive than the ROV's speedometer, so the speedometer was used as the trigger for engaging the button-based speed limitation mechanism.

### **3.2.2 Study Terrain**

There were several terrain differences among the three locations used for the hands-on trials. Not only were the topography of the space used for the trials different, but the diversity of the surrounding trails and the populations of owners/users that participated at each location were quite unique as well. Below are descriptions of the areas and perceptions of how they differed.

#### **Emmitsburg, Maryland**

Emmitsburg sits in a relatively rural section of Maryland with participants recruited from the suburban and rural areas northwest of Frederick, MD and Washington, DC (75 miles to the Southeast). The trial area was located on property owned by the Federal Emergency Management Agency (FEMA).

The course was set up in a field with grass and weeds that was occasionally field mowed. There was a slight incline from one end of the course to the other with terrain that was typical for a hay field. Riding opportunities around the area include some state forest lands, seasonal limited use roads, and the like. Though some areas are mountainous, the areas are characterized by rolling terrain with logging roads and deciduous wooded areas with trails frequented by other riders of 2 and 4 wheeled machines.

### **Beckley, West Virginia**

Burning Rock Outdoor Adventure Park is located in the coal country of West Virginia, near the city of Beckley. Like Emmitsburg, Burning Rock has forested areas with deciduous and evergreen forestation in a very mountainous area lined with coal and logging roads connecting to a variety of blazed trails with more difficult, treacherous, watery, and steep character. Though some trails/roads allow relatively high speeds, large puddles and close vegetation often dictate cautious navigation with debris and tight turns under the treed canopy. Reports from participants suggested that Burning Rock was not unlike many other off-road parks in the area in terms of terrain and vegetation and the availability of high-speed and/or highly technical riding.

The hands-on trials were performed on a lawn area with flat, level, grass-covered terrain. Some areas of the course were torn up and muddy by the end of the hands-on trials as participants slid and spun through corners.

### **Ocotillo Wells, California**

Ocotillo Wells State Vehicular Recreation Area (SVRA) is a desert riding area about 2 hours east of San Diego. This state-run area has a variety of groomed, sandy roads. Major trails in this area may be 50 ft wide, flat, and level with miles between points of interest, allowing riders to easily pick up speed. Other trails include navigation of washes and ravines that take more technical skill and keen attention to spot other riders who may be approaching fast from other directions. There are some dune areas, small mesas and hills, and some trails that are much like ski moguls in character. In general, these areas afford relatively long stretches of high-speed transit and more technical riding at and near geological features and vistas.

The hands-on trials were performed in a parking area near a newly-constructed picnic area at the entrance to the park. The course was relatively flat and level with sandy soil that made sliding and spinning easy and frequent for some of the drivers.

### 3.2.3 Data Collected

Data were collected throughout the hands-on trials. These data came largely from a GPS sensor attached to the experimenter's tablet PC. GPS data were collected once per second for each participant's trials. GPS data included time, latitude, longitude, speed, heading, and altitude. The experimenter was responsible for indicating the distance traveled along each leg of a given lap (i.e., 50 ft, 100 ft, 300 ft, Tour and Transport) and the speed limiter condition (i.e., Buckled & < 30 mph, 10 mph, 15 mph, or 20 mph). Two additional conditions were added to identify the initial familiarization loop through the course designated as "Tour" and a "Transport" condition used to identify vehicle movements not associated with a given participant. Lap length and speed limitation condition were logged for each record of GPS data collected to allow assessment of the allowed and chosen speed aspects of each trial for each participant.

### 4.1 Summary of Participant Vehicles Represented

During both the screening process and the focus group discussions, participants were asked to identify the ROV make/model that they owned or used most frequently. Overall, seven different ROV makes and models were identified by participants, all of which are rated capable of going over 30 mph. The Polaris Razor was the ROV owned or frequently used by most of the study participants (12 participants). Other ROV makes and models owned by participants included: the Kawasaki Teryx (9 participants), Yamaha Rhino (5 participants), Polaris Ranger (4 participants), John Deere Gator (3 participants), Can-Am Commander (3 participants), the Honda Big Red (1 participant). Note some participants owned multiple ROVs. While attempts were made to collect information on the year of manufacture as well as information on the engine displacement, most participants were unable to accurately provide this information.

#### 4.1.1 Modifications to the Vehicle

Almost all of the participants made some modification to their ROV. Most of the participants in California indicated that they (and majority of their friends who own and ride ROVs) replaced the stock seatbelt (lap and shoulder combination) with either a 4 or 5-point harness system. When asked why, a majority indicated that this restraint type felt more secure for the type of riding they engage in, and additionally, they expressed a concern about making sure they were held securely inside the vehicle's roll-cage. We also heard of similar situations from a few of the recreational riders in West Virginia, but the seat belt modification was not as prevalent as in California

The most common alterations and additions included:

- A windshield
- Wench for towing
- Power Steering
- Modifications to the suspension system

- Snow plow attachment
- Replacement tires made for a specific type of riding (i.e. swamp tires or sand tires)
- Doors
- Top or roof
- Rear seat
- Communication radio

## 4.2 Riding Behavior

From information gathered during the screener and the focus group sessions, key insights into the typical riding behavior of ROV owners/riders that participated in this study were made. Topics of interest included frequency of use, typical riding (recreational or for utility), the typical riding terrain, average speed, and any crash or close-call experiences.

### 4.2.1 Frequency of Use

A fairly broad range of users with respect to frequency of use based upon participant self-reports of use was identified. Of the thirty-four participants recruited, eleven people indicated that they use their ROV on average 2-3 times per week. The below table provides the typical frequency of use patterns for participants as reported in their screener responses.

**Table 4-1. Frequency of Use**

Frequency of Use	Number of Participants
Once a Month	4
Several Times A Month	7
Once A Week	6
2-3 Times A Week	11
Almost Daily	6

### 4.2.2 Typical Riding

Nineteen of the thirty-four participants indicated that they use their ROVs mostly for recreation. Nine participants said that they use their ROV predominantly for utility purposes, for example to plow snow or for haul items or for other work on their property, such as farming. The remaining six participants indicated that the use of their ROV is split between recreation and utility purposes.

Most of the riders who indicated that they ride for recreation also indicated that they ride in groups on the different trails and that there is a strong social component to their riding. In California it was not uncommon for groups of ten or more ROV riders to camp near the trail heads and then spend the day riding together.

### **4.2.3 Typical Riding Terrain**

Typical riding terrain varied based the focus group location and upon whether the participant used the ROV for recreation or for utility purposes. Those who rode primarily for recreation cited a variety of different terrains. Recreational terrain varied based upon State, as described earlier (Section 3.2.2). Participants in the East Coast focus group sessions described trails through wooded areas. Specifically in West Virginia, participants mentioned wooded mountains/hills with loose dirt and gravel, as well as mudded areas and pools of water. In California, participants described two different types of desert terrain that were common for riding. These included mountains with many rocks and boulder scrambling, as well as sand dunes. Most of the terrains mentioned in California were open space riding, with fewer trees than in the East Coast trails.

Most participants who described using their ROV on their own property for utility purposes described the terrain as mostly flat with occasional low grade inclines and hills. Some participants indicated that their property had areas of dense trees and others described more open spaces. Others indicated that the other type of terrain that needs to be considered is snow and ice because they also used their ROV for plowing snow at their property.

### **4.2.4 Average Speed**

Average reported speed was closely associated with the type of riding (utility vs. recreation). Participants who primarily ride for recreation indicated that they typically ride at higher speeds, usually between 25 mph and 80 mph, with most indicating an average speed of 35-45 mph. Conversely, participants who use their ROV for utility purposes indicated much slower speeds, usually between 5 mph and 30 mph, with the average being closer to 16 mph. Most participants said they rarely go above 25 mph when riding on their own property. Those who said they ride for utility or work purposes also cited that they tend to drive slower because they are usually not traveling long distances before stopping and exiting the ROV, and therefore, do not get up to a high speed. Others indicated that they drive slower because they are hauling something that they do not want to fall off.

Not surprisingly, speed also depends on the maneuvers the driver was trying to make, and the terrain. In general, participants in California cited higher average speeds than participants on the East coast. ROV riders in California mentioned that the flat open desert areas allow them to ride at higher speeds because their perceived risk of crash and injury is low, but they may slow down on the hilly areas or areas where their line of sight is obstructed. Conversely, recreational trails in Maryland and West Virginia tend to have areas of dense tree growth and repeated curves or tight turns. Riders explained that this type of terrain calls for more “technical riding,” including frequent maneuvers and usually at slower speeds.

## **4.2.5 Accidents & “Close Calls”**

### **Accidents and/or Close Call Experiences**

Thirteen participants indicated that they had been involved in an accident of some sort and twelve participants indicated that they knew someone or multiple people that were involved in an accident. Additionally, most of the participants were able to recall a close call experience where they felt they had chance of getting into a crash or experiencing a potentially dangerous situation where they were likely to be injured. Accident scenarios described by participants ranged in severity. Participants mentioned the following accident scenarios: collisions with other ROVs; collisions with stationary objects, such as trees and rocks; roll over and flipping situations; tipping the ROV onto its side; losing control and sliding down a steep hill, and running off the embankment or trail. Several participants in California indicated that head on collisions with other ROVs are a major concern while riding. Many attributed this to people driving at a high rate of speed in an area where visibility is limited, such as approaching the apex of a hill. As a result, many of the State parks and trail riding facilities now require ROVs to be equipped with a tall whip flag to help increase visibility of other riders.

However, not all of the accidents mentioned were the result of traveling at a high rate of speed. One participant in California described an accident where the ROV flipped over while she was attempting to climb the steep incline of a sand dune. She attributed the accident not to speed, but instead to her lack of experience and skill with respect to the proper way (circling the base and gradually ascending instead of driving straight up) to reach the summit of a sand dune. Similarly, a participant in West Virginia described a situation where he rolled his ROV because he approached a steep incline with not enough speed to mount the hill and he started to slide and roll. Both participants reported to be belted during these incidents.

A few of the participants implied that tipping the ROV onto its side was a fairly common occurrence when riding; and therefore, not considered that severe of an accident among riders. One person described the experience by saying, “I’ve tipped it a bunch, but that’s no big deal. You just climb out and turn it back onto its wheels.”

When describing the accidents, several of the participants mentioned scenarios when seat belt usage played a positive role. One participant described a roll over where he was a belted passenger. In this particular situation, the driver was not belted, and the driver ended hitting him (the belted passenger) and injuring him. Another person described a friend who drove over a cliff in their ROV, but was wearing a 5-point harness and survived.

### **Likelihood of a Crash**

Participants seemed to agree that the likelihood of a crash varies based upon trail conditions or where they are riding in their ROV. For example, participants indicated that there was a very small chance of a crash or accident when driving the ROV on their own property or around the campsite. Alternatively, participants believed the possibility of a crash increased greatly when driving on the trails or when out riding for recreation. Some participants attributed this difference to the fact that trail riding has more unknowns, such as terrain, other riders, the potential for a difficult maneuver to be performed, etc. Others attributed the likelihood of a crash to be impacted by speed, indicating that on their own property they tend to go less than 25 mph, but when riding for recreation it is not uncommon for that speed to double. Still others felt that the drivers’ level of experience plays a significant part as well.

## **4.3 Seat Belt Use**

Among the 34 participants recruited for this study we identified two types of belt users, non-users and part-time users. While all of the participants indicated that their ROV’s have restraint systems, eight of the thirty-four participants said that they do not usually wear their seat belt when driving their ROV. Of these eight participants, seven indicated that they use their ROV mostly for utility or work purposes and one non-belt user indicated primarily recreational use. Of the remaining twenty-six participants, the majority initially said that they *always* wear their seat belt when driving the ROV. However, upon further discussion most admitted to being part-time seat belt users, and restraint use was often related to the circumstances under which they were using the ROV. Most of

the part-time seat belt users maintained that they *always* wear their belt when out on a trail or when riding for recreation, but rarely wear their belt when riding to do a chore or task on their own property, riding around a campsite, or riding on terrain that is familiar to them. Circumstances where a participant would choose not to use a seat belt included:

- “I do not plan to ride fast enough to warrant putting on the seat belt.”
- “The work I am doing requires me to get in and out of the vehicle frequently, and putting on and taking off the seat belt repeatedly would be a hassle.”
- “I am only going a short distance.”
- “When I am driving at such a slow speed (like I do on my property or at the campsite) I don’t wear my belt because even if I were to crash nothing is going to happen where the seat belt would be of much benefit when at that slow speed.”
- “When I am doing farm work and getting in and out a lot, wearing the belt would be an inconvenience.”
- “It is uncomfortable to wear.”
- “Since the ROV is exposed to such much mud and dirt the seat belt mechanisms get clogged and they can be a pain to operate.”
- “On trails there is a lot of rough and unknown terrain so this is why I wear a belt out there, but at home I don’t go fast and there is zero percent chance of me getting in a wreck... wearing a belt when getting in and out frequently would just be inconvenient.”
- “The way the belts are designed requires a lot of ‘personalization’ (manipulation) to get a proper fit and this is tedious if you are going to be buckling and unbuckling a lot, such as when you are doing a chore in your ROV.”
- “The design of the seat belt makes it very difficult to use and does not seem worth the hassle if you are only going short distances and not very fast.”

As previously mentioned, most participants who ride primarily for recreation said that they use their seat belt. However, few indicated that on occasion they won’t wear their belts on the trails. Some said the lack of belt use may be due to their comfort level with a trail, for example if it is considered an “easy trail,” they may elect to ride unbelted. Others mentioned that sometimes they simply forget to buckle up. Two or three participants explained that they purposely don’t wear the seat belt when trail riding because they think it will hinder them from being able to exit the ROV in a dangerous situation. One participant further explained that she wants to be able to have the freedom to react quickly in case she not only needs to save herself, but also unbuckle her two children that ride with

her in the ROV as passengers. It is important to note that this participant restrains her small children in the ROV using passenger vehicle Child Restraint Systems.

Five participants indicated that they replaced their stock seat belt with either a 4- or 5-point harness system (all of these participants were either from the West Virginia or California sessions).

Participants explained that they choose to do this for safety reasons because of the riding they engage in is more likely to result in their ROV rolling. These same participants explained that despite their strong desire to be secured in the ROV, they too tend to not restrain themselves if they are going on a short trip or using their ROV for a utility purpose.

### **4.3.1 Reasons for Use/Non-use of the Seat Belt**

A common theme of reasons for seat belt use/non-use emerged in all of the focus group sessions. Participants indicated that the choice to wear a seat belt is influenced by a combination of the following factors:

- the speed at which they plan to travel;
- the inherent danger or degree of risk associated with what they a plan to do;
- the terrain they are riding on, the distance they plan to go; and,
- the maneuver they are performing in the ROV.

One participant likened the choice to buckle up to, “weighing the hassle versus the reward.” The hassle of the seat belt was mostly attributed to the seat belt design and difficulties they experienced when trying to buckle up. Additionally, participants felt more secure when riding on their own property where they perceived there to be no risk of crashing into another ROV and they were familiar with the terrain. Therefore, they were less likely to wear their seat belt under these circumstances.

### **4.3.2 Passenger Belt Use**

When asked about passenger belt use, most participants indicated that they do not force adult passengers to wear a seat belt unless they are going on a trail, and there is a “high level of risk.” Most indicated that the adult passenger will usually follow the driver’s example. However, regardless of their own belt use patterns, all participants seemed to agree that child passengers always need to be properly restrained and seemed unwilling to make exceptions. A few participants mentioned that

while they may not buckle up when riding alone or with adult passengers, they will always buckle up in the presence of a child to set a good example. Several other participants mentioned installing additional child restraint systems (car seats) into their ROVs so their children/grandchildren will be able to ride safely.

### **4.3.3 Perceived Protection during a Crash**

Although not all participants were full-time belt users, and some not even part-time belt users, all believed the seat belt offers some degree of protection during a crash. Many participants shared the belief that using a seat belt decreases the likelihood of getting injured during a crash. A few participants made the distinction between rollover crashes and side or front collisions. Some of these participants indicated that the seat belt makes more of a positive impact in the case of a rollover because it prevents you from being ejected. However, not all participants shared this sentiment; others felt that wearing a belt prevents the driver from exiting the ROV during a rollover, and increasing their chances of being impaled by something. With respect to this, one person said, “95% of the time it would be of benefit (to wear the seat belt), but in the situation where you are going down a hill and need to jump out then it could be a hindrance.”

When asked if they think wearing the belt had any impact on their confidence and in turn on how risky or fast they may drive, in general participants did not seem to think so. Participants said that their comfort, level of experience, and familiarity with the terrain were more likely to play a part in determining the risks they would take when driving. However, a few participants mentioned that if they don't feel as confident, they might be more willing to buckle up. As one person said, “It is more because of the risks that you plan to take that you wear the seat belt.”

## **4.4 Participant Response to Field Trial Task**

Participants felt that the task was representative of using the ROV to do utility work around their property, travelling around a campsite or for some other utility based activity where they were required to get in and out of the ROV frequently. Those who rode for recreation likened it to how they use their ROV at campsites, when hauling wood, or for transportation to the bathrooms, etc.

Participants found the task of picking up the golf balls to be a bit tedious, a bit more so than any task they could relate to in their own lives. All of the participants admitted that they would be

unlikely to wear their seat belt if they were performing this task in their own ROV because unbuckling and re-buckling the seat belt would be a hassle with as many stops as they were asked to make. Similarly, participants admitted when they perform any task where they intend to exit and enter the ROV with some frequency they are not likely to wear the seat belt. Additionally, most participants said that they would be unlikely to wear a belt at the speeds they experienced in each trial (speeds of less than 30 mph), especially if they were traveling on familiar terrain. A few participants commented that if they were required to wear a seat belt in order to go above a given speed, they would be more likely to walk to the shorter distances (50 and 100 feet) rather than spend the time buckling and unbuckling the belt in order to get into and out of the ROV.

In general participants mentioned that the limited speeds were less noticeable on the shorter distances. Many indicated that it was difficult to get up to the limited speed before they were required to slow down in order to stop and retrieve the golf ball. Conversely, participants said that it was very difficult to be limited to 10 and 15 mph when driving to the longest distance (300 feet). The following sections provide brief summaries of participants' reactions to the four different speed trials.

### **Thoughts on the Self-Selected Speed Trial (under 30 mph)**

During the self-selected speed trial, participants were asked to wear the seat belt and told they were allowed to drive at any speed they wished under 30 mph in order to retrieve the golf balls from the three stations. In general, participants felt that putting the belt on and taking it off again when getting in and out of the ROV six times during this trial was a bit cumbersome. While participants liked the ability to drive at their chosen speed, especially during the longer stretch of 300 feet, they did not favor using the belt when performing the task. A few participants explained that the contour of the seats and the netting feature (of the Can-Am Commander 1000) got in the way and added to the difficulty of getting in and out of the vehicle. Additionally, participants mentioned that on occasion the buckle stock of the seat belt would slide down between the seats and get caught, making it difficult to insert the latch plate. Participants suggested that the buckle stock could be modified so that it had a sturdier frame, thus allowing participants to be able to, "click in more quickly." Similarly other participants expressed frustration over the retractor locking up. A few participants indicated that due to the nature of their riding (through water, mud, dirt, etc.) that it is not uncommon for "gunk" to get on the seat belt parts. They explained that this may prevent the belt from moving freely creating a more cumbersome situation, and sometimes adding to their hesitation to wear the belt if they know they are going to be unbuckling and re-buckling with some frequency. In general, participants were not in favor of the seat belt design and suggested that if

improvements were made to the design that they may be more inclined to use the seat belt. With the current design, participants explained that it took several attempts to successfully buckle and simply put, “took too long to do,” and was frustrating.

### **Thoughts on the 10 mph Speed Trial**

Almost unanimously participants seemed to think that the 10 mph speed was too slow. Common remarks included:

- “This was too slow, I could walk faster”
- “I would never wear a belt at this speed, regardless of the distance I am traveling”
- “Going this slow is a waste of gas.”

A few participants pointed out that being limited to 10 mph was less noticeable at the shorter distance of 50 feet, because it was difficult to get up much speed in such a short distance anyway. However, participants really did not like traveling the longer distance of 300 feet when being limited to 10 mph. Interestingly, after being limited to 10 mph, a few participants who originally estimated their average speed (when doing utility tasks) to be about 10 – 15 mph revised their estimate indicating that they more than likely go faster because the 10 mph speed trial felt unusually slow. While most participants remarked this was too slow, three of them still thought it was the best speed to set the limiter. One participant explained that, “If the purpose of this limiter is to get people’s attention and have them consider putting on the seat belt, then 10 mph is the best speed because it is so slow, it will get people’s attention.”

### **Thoughts on the 15 mph Speed Trial**

In general participants appeared more favorable to the 15 mph speed trial. Several still explained that they thought it was still slow, but more acceptable in comparison to being limited to 10 mph. As one person explained, “It is still too slow, but better than the 10 mph.” Another person mentioned, “It is a little better, but only for the short distances.”

Other participants likened the 15 mph limit to a speed they would drive when performing tasks on their ROV. For example, one person said it was the speed they drive their ROV when they are aerating. It is important to note that one participant mentioned that 15 mph might be an ideal speed for the speed limiter when an experienced user is driving, but thought it might be too fast if a

younger or novice ROV user is driving. While participants were more favorable of this speed they still expressed a desire to be able to go faster.

### **Thoughts on the 20 mph Speed Trial**

Overall, participants seemed to be the most accepting of the 20 mph speed trial, but participants were split as to whether this would be an appropriate speed to set the limiter. A few participants felt that 20 mph might be too high of a speed to set the limiter. One person indicated, “At 20 (mph) you can do some damage, so you should probably be belted” and another person said, “This speed seems to be pushing it without a belt.” Others mentioned that they would have probably buckled up at this speed if they were riding in their own ROV.

Only two participants mentioned that the limit should be set to a higher speed than 20 mph or there should be no limiter at all. Several participants commented that 20 mph seemed close to the speed that an average riding lawn mower goes, and those do not require seat belts.

## **4.5 Seat Belt Speed Limiter**

### **4.5.1 User Acceptance**

In general, acceptance of the speed limiter appeared to be low among participants. Participant responses as to why seemed to echo what is heard from people who oppose government mandates for passenger vehicle seat belt use or motorcycle helmet use, citing personal freedoms as a primary factor. One participant explained their opposition to a limiter by saying that it goes against the nature of the vehicle. In this participant’s opinion the ROV is made for extreme riding and using it comes with some inherent risk, and the user should be able to choose how risky they wish to be.

#### **Reduces Efficiency**

Those who were against implementing a seat belt speed limiter cited several reasons, one of which was efficiency. Requiring the driver to buckle and unbuckle the seat belt will extend the time it takes to complete chores. One participant explained that she uses the ROV for farm work and wearing the belt would be a hindrance to her efficiency, really slowing her down. She further explained that, “I do not put the ROV in park (when she exits) because it is one more step, and therefore, I never

even think about putting the belt on, again because it is an additional step and it would slow me down.” She explained that, “I need the ability to go whatever speed is needed, for example if there is an emergency like a big storm. I need to go from one location to another quickly to tend to the animals and prepare for the storm.” Interestingly, the same person was adamant about wearing her belt when riding for recreation, explaining that, “if you ride with me you are going to buckle up or you are going to walk.” This participant’s justification for her reason to buckle when riding for recreation is that the perceived risk is much greater than when on her own property.

### **Impediment to Safety**

Other participants were concerned with safety issues that might result from speed limiter. Participants explained that there are times while riding that you need to be able to accelerate fast with a lot of power in order to prevent a crash with another ROV or avoid another harmful situation. Participants seemed concerned that the limiter may impact their ability to do so at a critical time. In addition, two or three participants mentioned that depending on the riding conditions, it may be safer for a rider to be unbelted; and therefore, having a limiter that forces people to wear the belt could be more dangerous. Participants indicated that riders are at risk of being impaled by something when riding on some trails where there is the potential to go over a cliff or to roll over. The rider needs the ability to be able to jump out of the ROV quickly, and a seat belt would hinder this.

A few participants mentioned the concern that the speed limiter is an additional electrical system that has the potential to malfunction or break. Participants explained that due to the nature of terrain (mud, water, dirt, etc.) there is the potential for parts on the ROV to be exposed to extreme conditions. There was concern that these elements may cause the limiter to break or malfunction while the rider was out on a trail, perhaps far from the trail head, and then the ROV would be limited to a lower speed despite the fact that the driver is belted.

### **Change seat belt use behavior**

A few people said that having a limiter may affect their decision to wear a seat belt, but the majority indicated it would not. Participants indicated that the limiter would be more likely to impact their decision when out riding for recreation or times when the desire was to ride fast; however, many participants mentioned that they already choose to buckle up during these situations.

Participants said the limiter was less likely to change their behavior when riding for utility purposes, since this type of riding requires the driver to get into and out of the ROV with some frequency. Under these conditions, participants indicated they would be inclined to accept the limited speed rather than deal with the hassle of having to buckle and unbuckle, since they would not elect to travel that fast anyway.

In general, participants seemed more willing to accept the limited speed if it were set higher than 10 mph. Similarly, a few participants mentioned that they would be more inclined to tolerate a slower speed when driving shorter distances, but may buckle up for longer distances (even if on their own property) so they would have the ability to travel faster. Of those participants who believed the limiter would be ineffective at changing their belt use behavior, many said they would or know someone who would disable or by-pass the system (discussed in detail later).

While many of the participants had negative opinions of the seat belt speed limiter as it related to their ROV use, many recognized a safety benefit. Many participants indicated that the speed limiter would be a good feature for when children are driving ROVs. One participant suggested that the speed limiter might serve as a good teaching tool for new riders to help encourage belt use, since in this person's opinion these were the people more likely to get into an accident due to inexperience.

### **Speed Limiters tied to passenger seat belt**

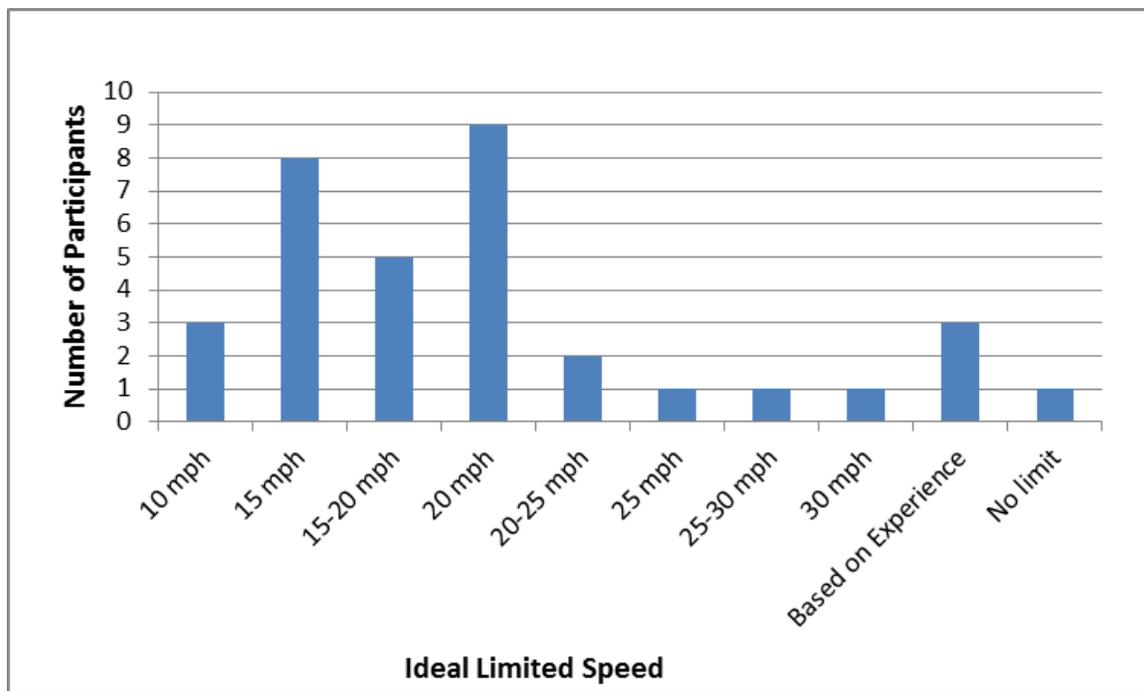
Participants were asked for their opinions regarding having the speed limiter tied to the passenger's belt use. Not surprisingly, participants did not appear to be in favor of this idea. Participants said that they would hate to have the speed of *their* vehicle linked to a decision made by a passenger. One participant said, "My wife does not wear a belt because she thinks it is uncomfortable and I don't think the limiter would impact her decision to wear a belt." Others were concerned with the sensor have difficulty differentiating the human passenger from other heavy objects that the rider might place on the seat.

Finally, participants who removed the stock seat belt and replaced it with the 5-point harness were concerned that they would be negatively impacted by a limiter if they had one in their ROV. Participants were worried that having a limiter tied to the seat belt could result in additional out of pocket expenses to deactivate the speed limiter or find a way for the limiter to recognize the aftermarket seat belt they installed.

## 4.5.2 Adjusting the Limit

When asked to identify the ideal speed for the seat belt speed limiter to be set, a majority of the participants felt an ideal speed would be between 15 and 20 mph (8 people suggested 15 mph, 5 people suggested 15-20 mph, and 9 people suggested 20 mph) (see Figure 4-1). Three people were unable to suggest a speed for the limiter, but suggested it should vary based upon the driver's level of experience. Only one person refused to give a suggested adjusted speed, instead stating that there should not be a limiter.

Figure 4-1. Participant Suggestions for a Revised Limited Speed



## 4.5.3 By-passing the Speed Limiter

Many of the participants admitted that they might by-pass the speed limiter (at times), or that they know someone who would. Participants suggested that with the current design, it would be very easy to buckle the belt behind the vehicle occupant in order to by-pass the system. One participant, who owned a BRP Commander, admitted to doing this on occasion when riding around on his property. Others suggested performing a more permanent by-pass, such as pulling the fuse out, so long as it would not damage the vehicle or impact the manufacturer's warranty. A few participants did indicate that the speed limiter system would impact their decision to buy the ROV, and that they would consider a vehicle that does not have the system.

#### **4.5.4 Suggestions for Increasing the Appeal of the Limiter**

Participant offered several suggestions for increasing the overall appeal of the speed limiter. Many suggested the option of customizing the limiter, so that it could limit the vehicle to different speeds depending on the user. That is, the speed limit could be adjusted depending on the experience level of the driver. Many participants felt that younger drivers should have the vehicle speed limited due to their lack of experience. Participants suggested the use of a different key that would limit the vehicle to different speeds. Others suggested using an audio alert similar to what car manufactures use to remind the person to buckle their seat belt. One participant suggested the focus should be increasing the appeal of the seat belt rather than the limiter. This participant specifically mentioned modifying the buckle stock so that it doesn't fall down between the seats and adjusting the shoulder belt so that it is easier to reach and maneuver.

## Analysis of Speed Trials- Vehicle & Video Data

The following sections provide a summary of the data collected during the different trial runs. The data below presents speed data from 33 of the 34 participants because one participant's data was inadvertently not collected (Participant ID=10). After the participant completed each trial, they were presented with a series of questions by the experimenter to gather information about their thoughts on the task they were asked to perform and their impression of the limited speed setting they just experienced.

In each graph, the dashed red line represents the limited speed for the trial. Note, the data in the graphs show that some participants were able to momentarily reach a speed above the specified limit due to the nature of how the test limiter was designed (see Section 3.2.1). The speed limitation system used for this study was meant to provide an approximation of the speed limitation levels in the study protocol for the purpose of allowing participants to speak authoritatively and based on actual experience about their assessment of each limit category. The approximation is not unlike that of the manufacturers own speed limitation system in that slight changes in terrain, grade, or other factors can affect the level of limitation by 1-2 mph. It should also be noted that any excursions above a trial's prescribed limit were momentary, and then quickly corrected by the experimenter and/or slowing for the golf ball task. No sustained excursions above the limits were possible. The data in the graphs represents the maximum speeds achieved during each of the respective trials.

The data were examined for differences in the elected speeds driven during the trials between those participants who indicated that they ride primarily for utility compared to recreational users or split utility / recreational users. No strong differences among ROV user types were observed. Overall participants who elected to drive faster during one speed trial tended to drive faster on subsequent trials.

### 5.1 Self-Selected Speed (up to 30 mph)

During the self-selected speed trial, when driving shorter distances (50 or 100 ft), no participants reached the limited speed of 30 mph. For most of the participants, the elected speed tended to increase as the distance between home and the station increased. Few participants reached a

maximum speed of approximately 15 mph when traveling to the 50-ft station, and only one participant reached a speed over 20 mph when traveling to the 100-ft station. The average maximum speed when traveling to the 50-ft. station was approximately 10 mph (see Figure 5-1) and 14 mph when traveling to the 100-ft station (see Figure 5-2). For the longer distance (300 ft), the maximum speed for most participants hovered around between 20-25 mph, while some selected speeds were closer to the limited speed of 30 mph, and others elected to travel at speeds around 15 mph. The average maximum speed for the 300-ft self-selected speed condition was 21.8 mph (see Figure 5-3).

**Figure 5-1. Self-Selected Speed Trial: Participant maximum speed when traveling to the 50-ft station**

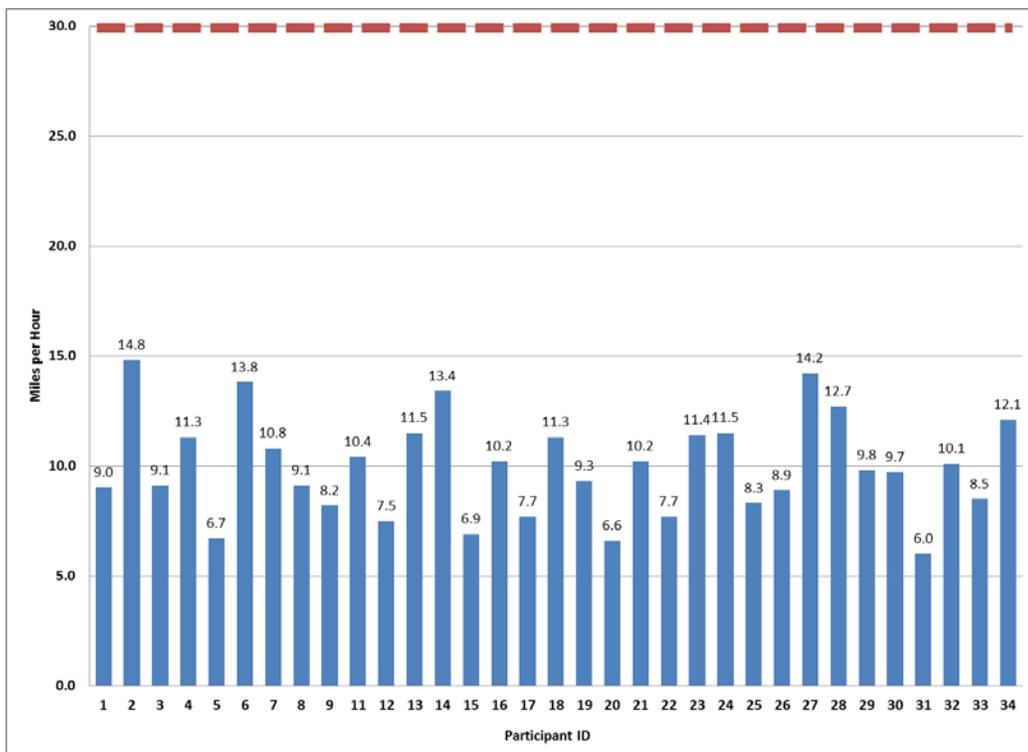


Figure 5-2. Self-Selected Speed Trial: Participant maximum speed when traveling to the 100-ft station

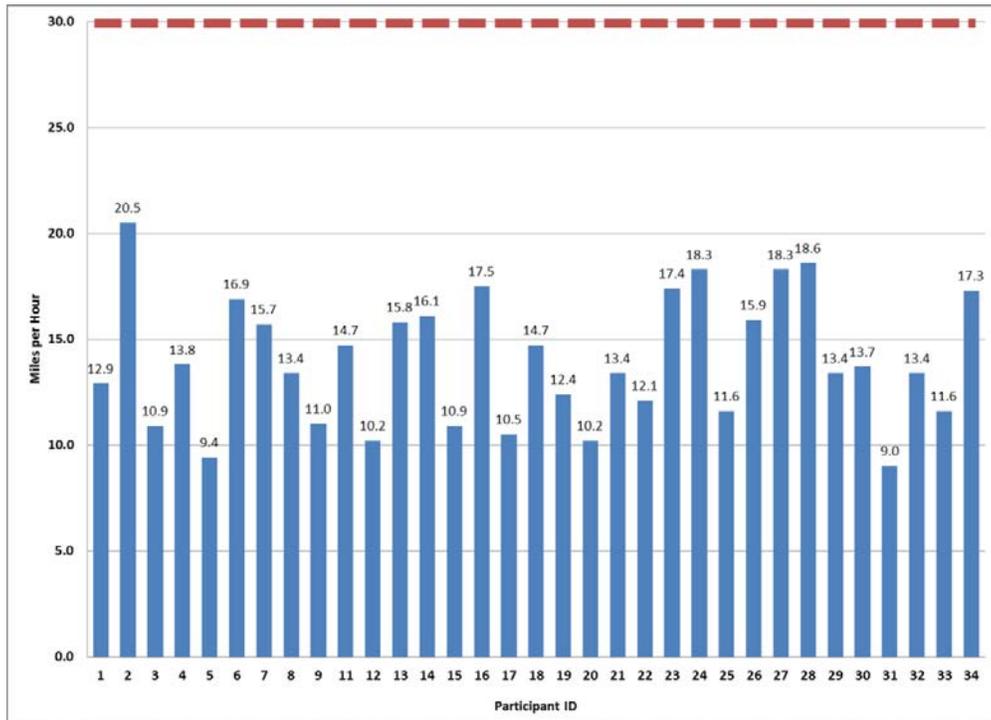
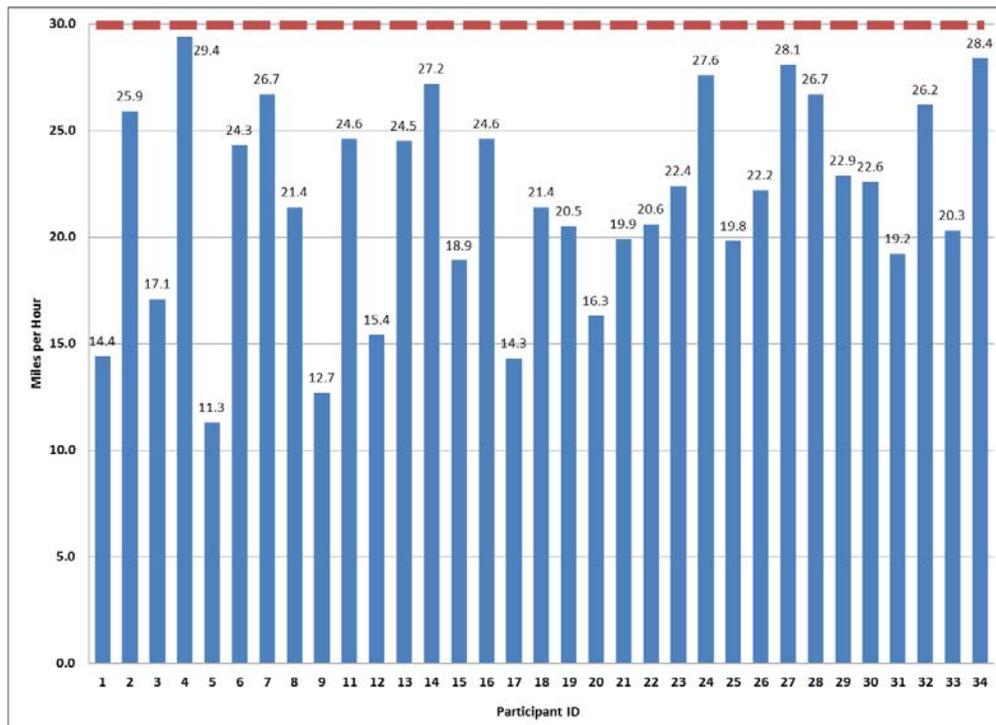


Figure 5-3. Self-Selected Speed Trial: Participant maximum speed when traveling to the 300-ft station



Participants were asked about their experience immediately after completing the self-selected speed trial and responses were similar to what they reported during the focus group session that followed. When asked if the use of the seat belt influenced their ability to complete the task during the self-selected speed trial, twenty-one participants indicated that the seat belt had some negative impact on their ability to perform the task. One participant explained, “If I were at home on the farm, I wouldn’t wear a seat belt, it would be too time consuming. Also, I didn’t go over a speed where I felt it was needed. Usually, I would wear a seat belt at over 15 mph and I didn’t go over that.” This particular person’s maximum speed during the self-selected trial was 11.3 mph.

Another participant said, “It was a pain in the butt.” This participant likened the experience to getting in and out of her ROV on her ranch, and mentioned that she doesn’t use the seat belt when she is doing that. A third participant said, “It is not so much the use (of the seat belt), but the design.” This participant did not like the seat belt location and suggested an improvement to the seat belt design. Another participant commented, “... a little cumbersome because of the seat belt. At this speed and to travel these distances I probably wouldn’t wear a seat belt.”

Participants were asked to estimate their speed during the self-selected speed trial. Twenty-five of the thirty three participants were able to estimate their speed within +/- 5 mph of their measured speed. Of these twenty-five, fifteen participants estimated their speed as slightly slower (within 5 mph) than their measured speed and nine people estimated they were traveling slightly faster (within 5 mph) than their measured speed (and one person estimated their speed exactly). The remaining eight participants estimated their speed to be more than 5 mph slower than their measured speed. Participants were only asked to estimate their speed during the self-selected speed trial. Participants were not asked to estimate their speed for subsequent trials because they were aware that the speed would be limited for the remaining three trials (10 mph, 15 mph, and 20 mph).

Participants were not asked to comment on their satisfaction with respect to the limited speed during the self-selected speed trial because they were free to travel at a speed of their choice so long as it was less than 30 mph.

## **5.2 10 mph**

During the 10 mph speed limiter trial, the average maximum speed when traveling to the 50-ft station was approximately 7.7 mph (see Figure 5-4). Several participants seemed to be traveling at

speeds close to the 10 mph limit threshold, and may have had their speeds suppressed by the speed limiter. When traveling to the 100-ft station more of the participants seem to have elected higher speeds that were limited by the speed limiter, while others still elected to travel at lower speeds. The average maximum speed was approximately 9.6 mph when traveling to the 100-ft station (see Figure 5-5). When traveling to the farthest station (300 ft from home base) participants' maximum speed was consistently over the limited speed with an average maximum speed of 10.7 mph, suggesting that most, if not all of the participants had their speeds limited by the speed limiter (see Figure 5-6).

**Figure 5-4. 10 mph Speed Trial: Participant maximum speed when traveling to the 50-ft station**

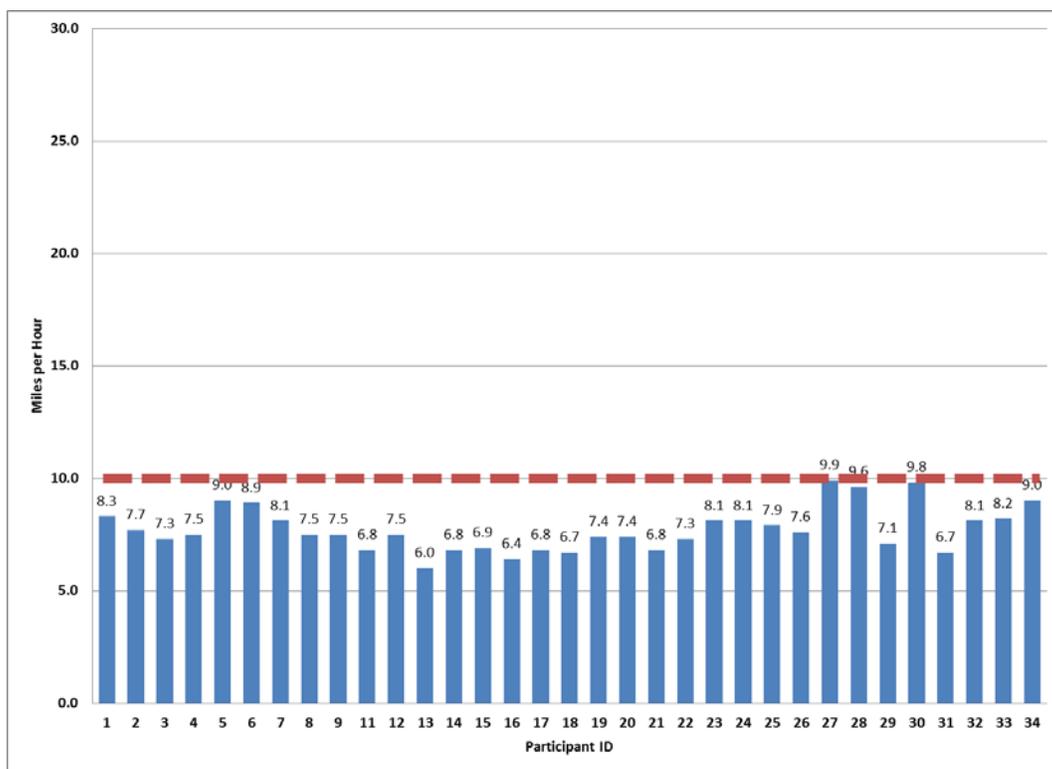
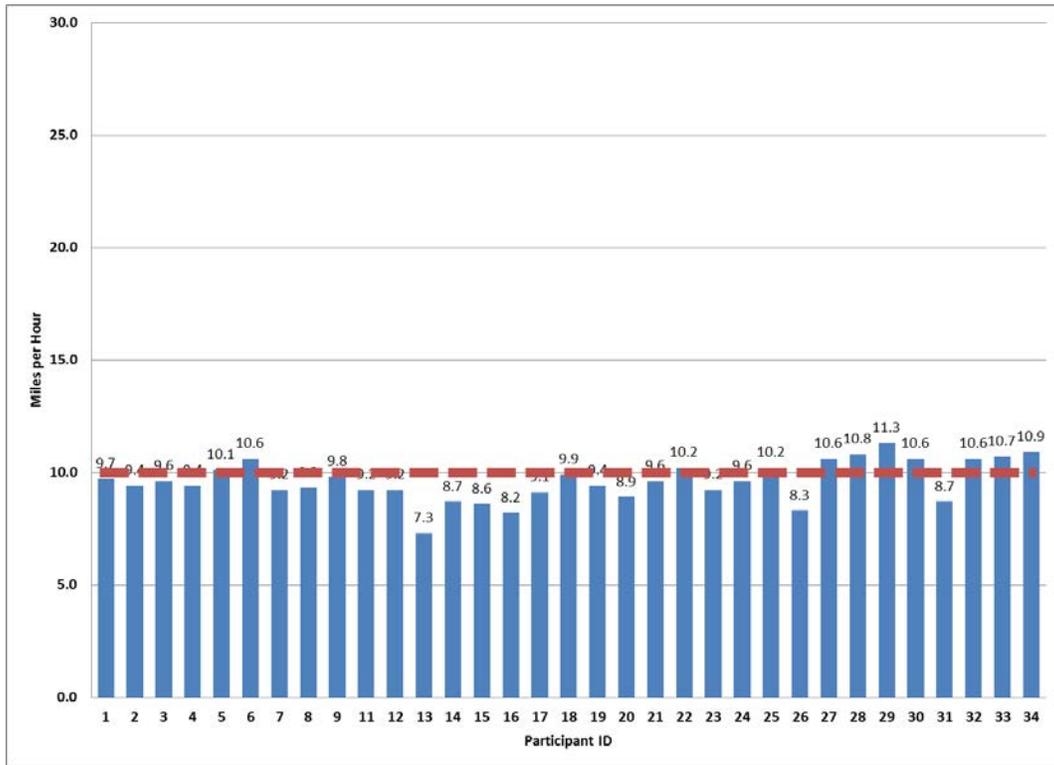
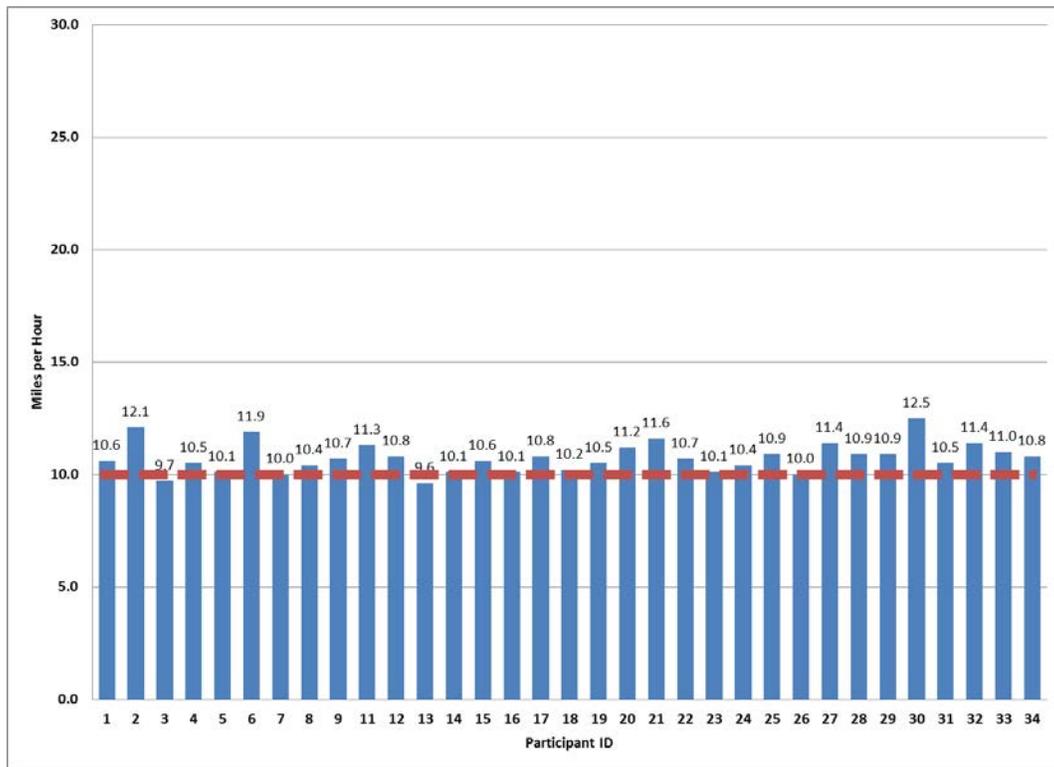


Figure 5-5. 10 mph Speed Trial: Participant maximum speed when traveling to the 100-ft station



**Figure 5-6. 10 mph Speed Trial: Participant maximum speed when traveling to the 300-ft station**



Once again participants were asked about their experience immediately after completing the 10 mph trial and again responses were similar to what they reported during the focus group session that followed. When asked about their initial reaction to driving the ROV at 10 mph twenty-two of the participants responded that the speed was too slow, boring, and not fun. One participant commented, “Might as well be driving an electric golf cart.” Another participant commented, “I do not like the restriction, too slow.” As far as the task overall, several participants mentioned that the task was easier to complete without the requirement of the seat belt. One participant actually preferred the slower speed over the seat belt, commenting, “I’d rather go a little slower and not have to use the seat belt.”

### 5.3 15 mph

During the 15 mph speed limiter trial, none of the participants reached a maximum speed of 15 mph when traveling to the 50-ft station. Most participants travelled at speeds between 7-12 mph when traveling to the 50-ft station and 10- 14 mph when driving to the 100-ft station. Data indicate that all

of the participants drove at speed below the limited threshold, with the average maximum speed when driving to the 50-ft station being 9.2 mph (see Figure 5-7) and 11.4 mph when driving to the 100-ft station (see Figure 5-8). When driving to the 300-ft station, a number of the participant's maximum speed was close to or momentarily above the speed limiter threshold of 15 mph suggesting that a number of the participants may have experienced the limiter. The average maximum speed when driving to the farthest station was approximately 14.5 mph (see Figure 5-9).

**Figure 5-7. 15 mph Speed Trial: Participant maximum speed when traveling to the 50-ft station**

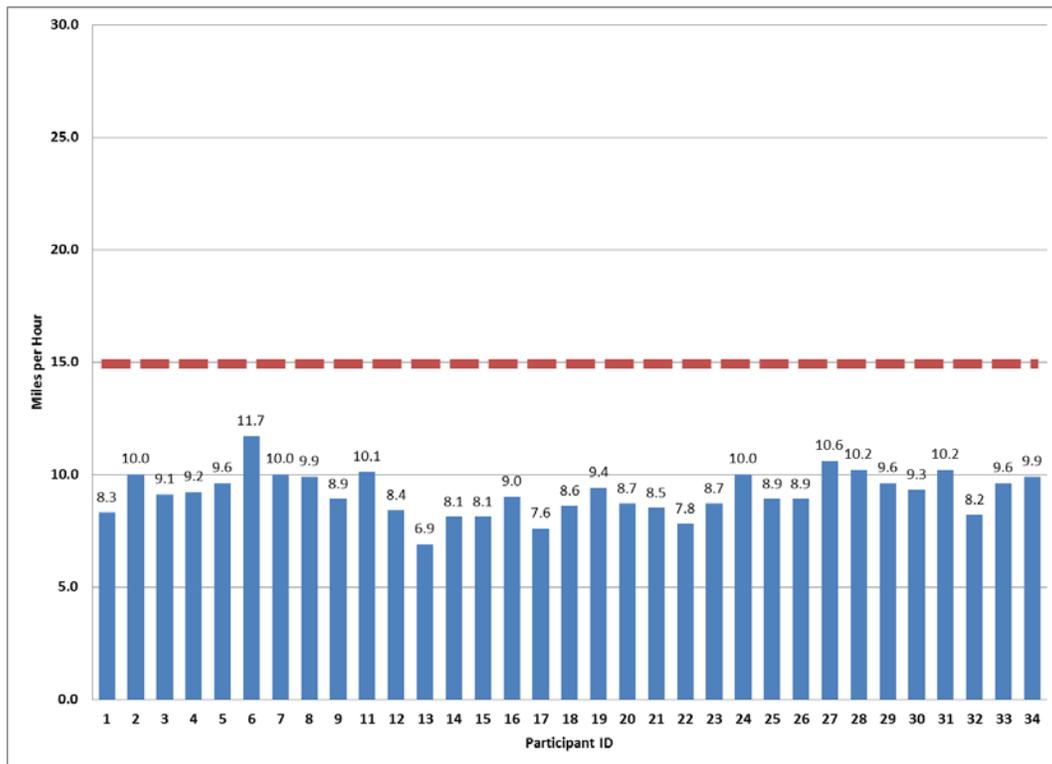
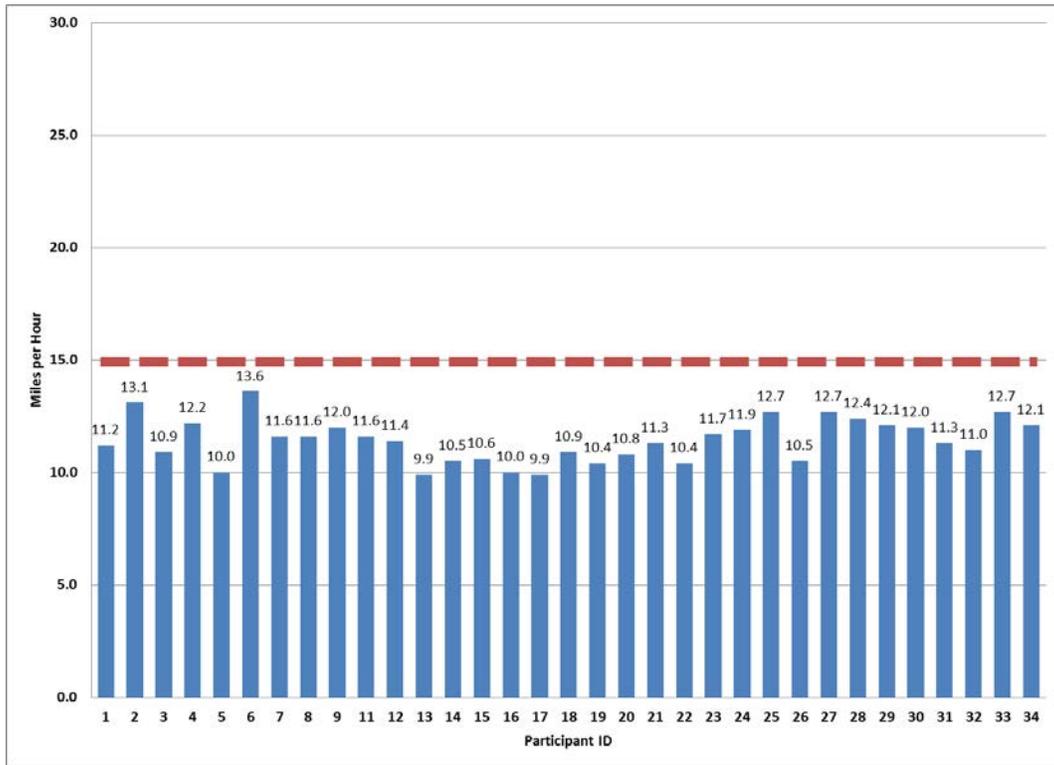
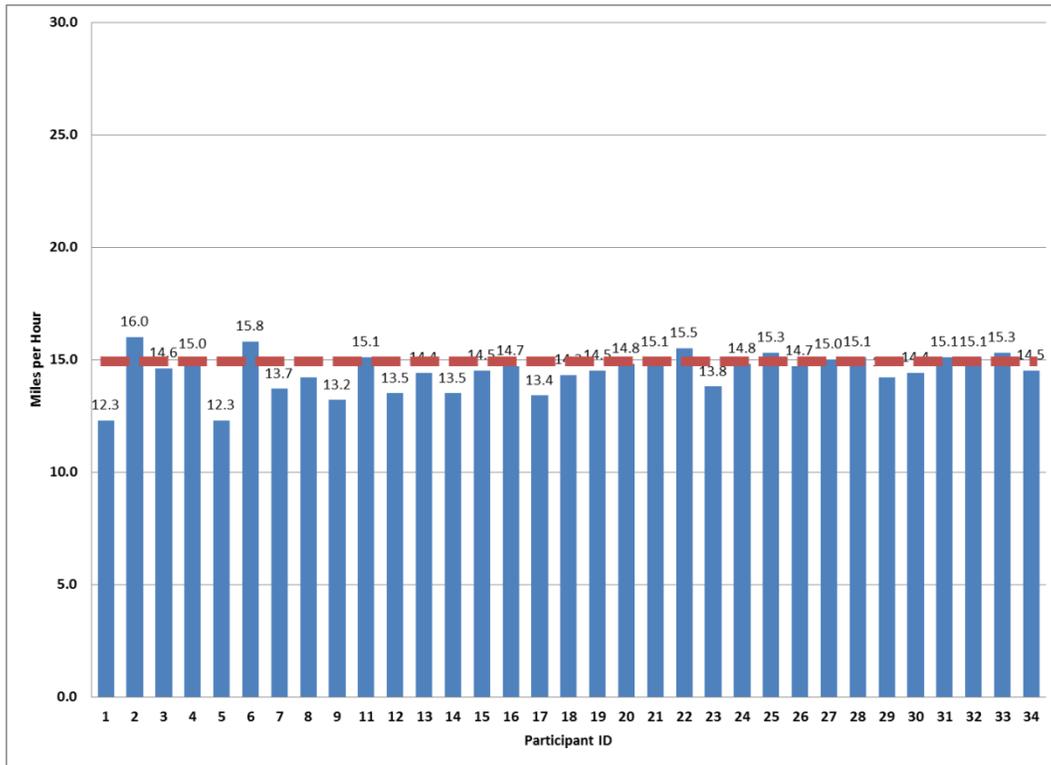


Figure 5-8. 15 mph Speed Trial: Participant maximum speed when traveling to the 100-ft station



**Figure 5-9. 15 mph Speed Trial: Participant maximum speed when traveling to the 300-ft station**



When asked for their overall reaction to driving the ROV at 15 mph, most indicated that the speed was more comfortable and better than the previous speed of 10 mph. In comparison to the 10 mph trial, one person said, “Gosh this is better.” Another participant said, “Better than 10 mph, but not as good as 30 mph.”

## 5.4 20 mph

During the 20 mph speed limiter trial, most participants travelled at speeds between 7-12 mph when traveling to the 50-ft station. In fact, the speeds and shape of the graph is very similar to the 15 mph speed limiter trial for the same distance (50 ft). The average maximum speed when traveling to the 50-ft station was 9.8 mph (see Figure 5-10). When driving to the 100 ft all but one participant elected maximum speeds between 10-15 mph, well below the limited threshold of 20 mph. The average maximum speed was approximately 13.0 mph when driving to the 100-ft station (see Figure 5-11). Overall driving speeds increased during the longest trial (300 ft). Participants maximum speeds ranged from approximately 12- 21 mph with the average maximum speed was 17.7 mph (see

Figure 5-12). While most participants drove at speeds below the limited threshold at least 3 participants might have experienced the limiter when approaching the maximum speed of 20 mph.

**Figure 5-10. 20 mph Speed Trial: Participant maximum speed when traveling to the 50-ft station**

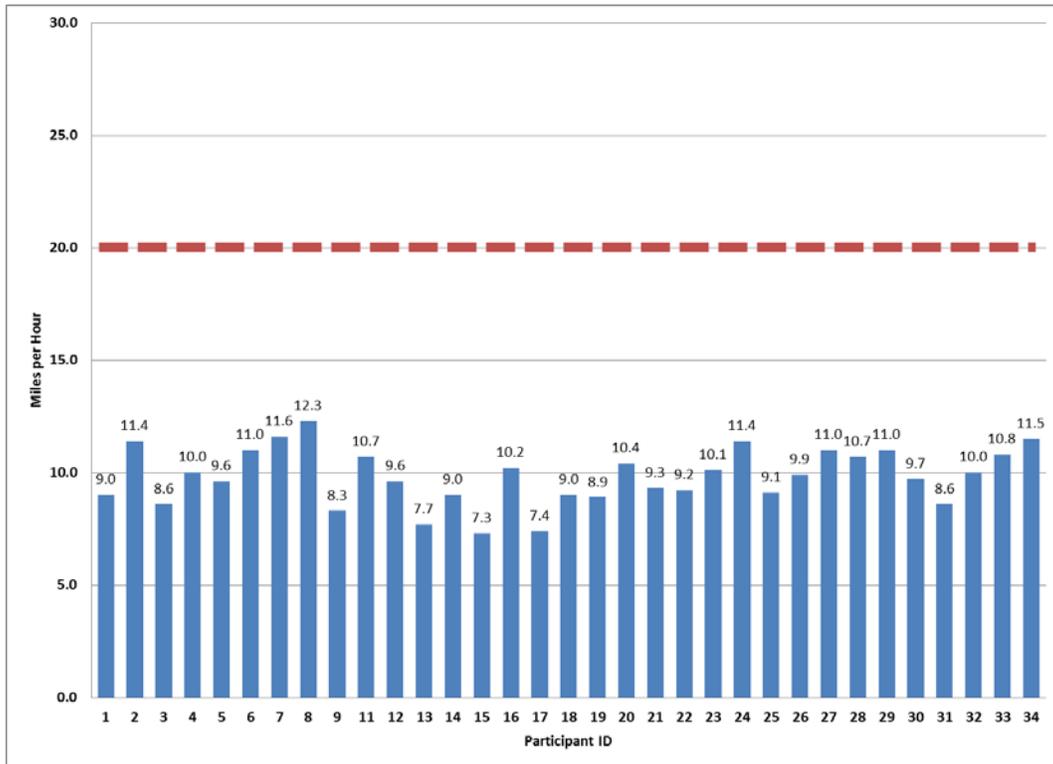
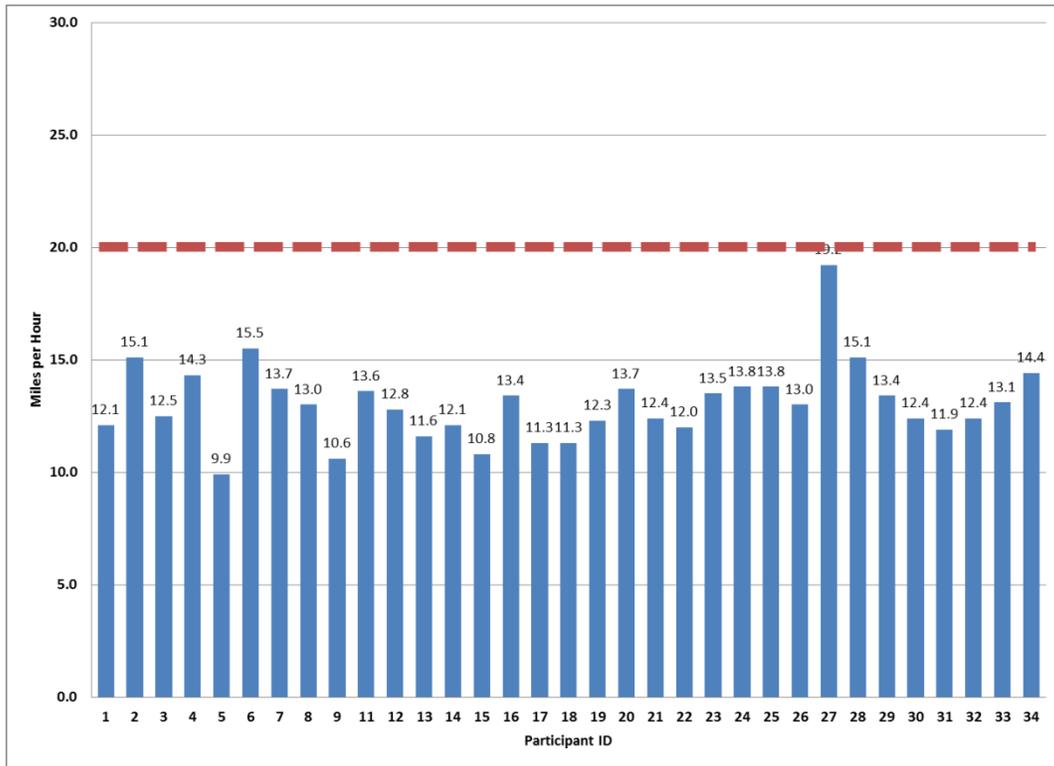
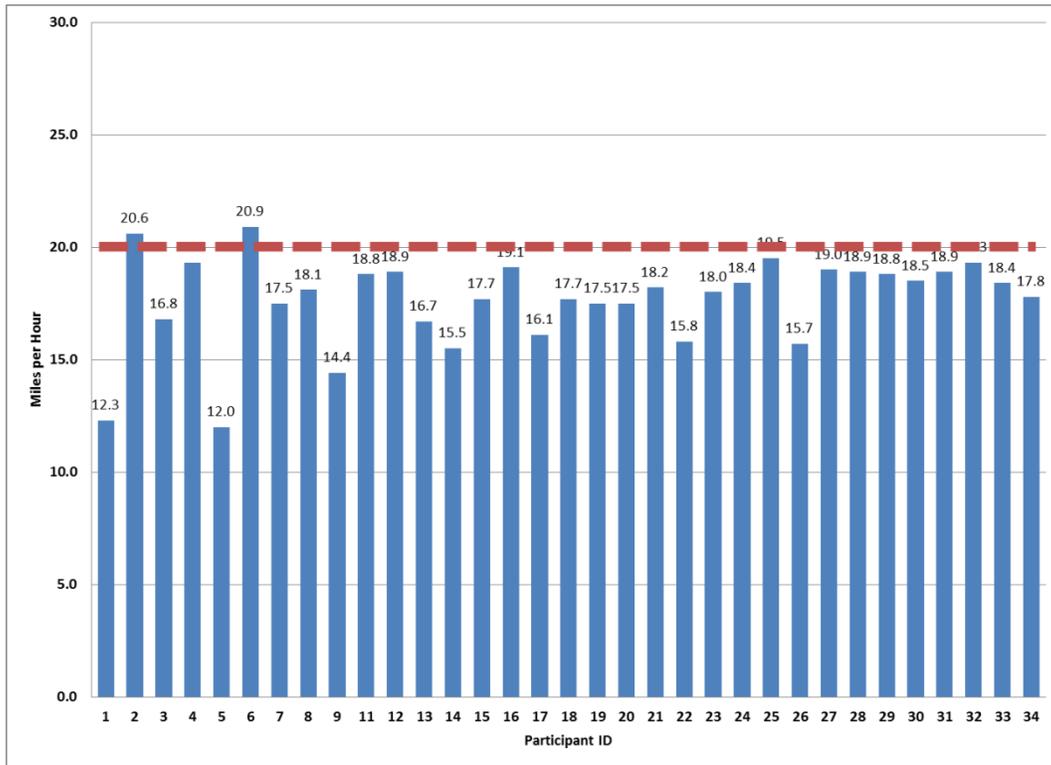


Figure 5-11. 20 mph Speed Trial: Participant max speed when traveling to the 100-ft station



**Figure 5-12. 20 mph Speed Trial: Participant maximum speed when traveling to the 300-ft station**



Participants were again asked about their experience immediately after completing the 20 mph trial. In general, the group seemed to prefer this speed over the 10 and 15 mph trials. One participant commented that of the various trials they thought that 20 mph was the best of all of them. Another participant thought the vehicle handled better at 20 mph. A different participant said that the 20 mph speed was, “more realistic, no different than riding a lawnmower and topping out at same speed.” However, one participant mentioned that they would prefer a higher speed for the longer distance. Another participant commented, “I would want to go this speed or faster to have fun, but not for working.”

Overall, when driving to the 50-ft and 100-ft stations, most participants seemed to elect maximum speeds between 15-20 mph when not limited to the 10 mph threshold. For the 300-ft trials the maximum speeds driven by participants was often higher than speeds driven during the 50-ft and 100-ft trials. During the self-selected 300-ft trial, participant speeds varied from approximately 11-29 mph, with nine participants exceeding a maximum speed of 25 mph. Conversely, during the 20 mph limit threshold 300-ft trial, maximum speeds varied from 12 -21 mph, with only two participants seeming to reach the speed limiter threshold.

Although the data clearly indicates that the speed limiter influenced some participants driving behavior by suppressing their desired speeds under the various driving conditions presented during the study, it is also evident that many of the participants self-selected driving speeds that were well within the boundaries of the various speed thresholds to complete the trials; and therefore, did not experience the speed limiter regardless of the distance travelled.

## Conclusions and Discussions

# 6

In summary, most of the participants indicated that they were part-time seat belt users. Their decision whether or not to use a seat belt is primarily contingent upon the riding conditions. Most will elect to use a seat belt when there is an increased risk of crash and injury present such as when riding along public trails for recreation, or riding on unfamiliar territory. The trails present a variety of situations that may increase risk such as the presence of other riders, unfamiliar and varied terrains from dirt trails to rocks and sand. While speed might influence some drivers to wear a seat belt, other drivers assess the degree of incline along individual slopes, steep hills, and rocky terrain when deciding whether or not to use a seat belt.

Few ROV drivers wear seat belts when riding for utility purposes or when riding in an area where the terrain is well known and perceived to be less risky. Most drivers did not use a seat belt when riding on their own property for utility purposes. In addition, they may not wear a seat belt when riding for recreation as long as they are on their own property or riding around a campsite. These locales are viewed as being less risky because the terrain is familiar, predictable and the ROV user can see for great distances in these areas. Overall, study participants indicated, the choice to wear a seat belt is influenced by a combination of the following factors:

- the speed at which they plan to travel,
- the inherent danger or degree of risk associated with what they plan to do,
- the terrain they are riding on, the distance they plan to go, and
- the maneuver they are performing in the ROV.

In addition, the seat belt design, fit, and ease of use often contributes to the rider's decision to buckle up as well. Several people mentioned that the seat belts in their own ROVs can be difficult to use. Participants also referenced the seat belt system in the Commander 1000, citing that they experienced difficulties with the buckle stalk sliding between the bucket seats, the retractor locking when the occupant pulled it toward the stalk requiring the occupant to have to repeat the motion again, and the latch plate being difficult to insert into the stalk. All of these physical challenges contribute to the driver's decision not to use the seat belt under some conditions. Often the driver

will feel that it is not worth the effort if they anticipate having to buckle and unbuckle with some frequency because they are getting into and out of the vehicle often.

It is important to note that of the 224 fatal ROV incidents documented by the CPSC, 147 (66 percent) involved rollover of the vehicle, and 56 of those incidents (38 percent) occurred on flat terrain. Similarly, of the 610 fatal and nonfatal injured riders, 433 (71 percent) were partially or fully ejected from the ROV. Two hundred sixty-nine (62 percent) of the 433 victims were struck by a part of the vehicle, such as the roll cage or side of the ROV as a result of being ejected from the vehicle. Seat belt use is known for 374 of the 610 victims; of these, 282 (75 percent) were not wearing a seat belt (CPSC September 24, 2014 Briefing Package).

It appears as if the details related to injury and fatality statistics describes above are not widely known or understood among all ROV users. Several participants made misinformed statements related to the above statistics and their reasons for not using a seat belt. These included:

- **Misinformation: The seat belt can impact a rider's ability to exit the ROV during a crash in order to escape injury.** While most participants recognized the benefit of wearing a seat belt during some types of crashes, some indicated that during some types of rollovers the occupants need to be able to exit the vehicle quickly and wearing a seat belt will impede this egress. One participant feared being impaled on a tree limb as a result of rolling over, so made conscious decisions to drive unbelted on some trails. This sentiment mirrors reasons given for not wearing seat belts in automobiles, despite the fact that roll over crashes account for more than a third of passenger vehicle occupant fatalities.
- **Misinformation: Riders are less likely to crash on flat terrain.** Many drivers felt that steep hills and inclines posed a greater risk than travelling along flat terrains at higher speeds. Few participants mentioned the risks of spinning out or rolling over that is often associated with traveling at higher speeds on flat terrains. This sentiment is not supported by the number of ROV incidents involving rollovers on flat terrain.
- **Misinformation: Experience reduces the need to use seat belts.** Most, if not all, felt that younger or novice drivers, as well as children, should use their seat belts all the time. However, when discussing their own user patterns, seat belt use was contingent upon the driving conditions and presence of other occupants. When travelling at slow speeds (10 mph) there was little if any risk of being injured during a crash. This sentiment is not supported by the number of ROV incidents involving adults at low speeds.

- **Misinformation: There is no measurable risk of crash or injury when riding on your own property or around campsites.** Most if not all participants indicated that there was little to no risk of driving unbelted on their own property or around the areas near the campsite. These areas are viewed as familiar and predictable. This sentiment is not supported by the number of ROV incidents involving rollovers on private property.

It seems as though there is a fair amount of misinformation present among users, suggesting a need for better public information and educational (PI&E) disseminated by industry as well as CPSC aimed at providing accurate information related to risks associated with riding and crash severity. Providing users with accurate information regarding the risks associated with driving an ROV unbelted under a variety conditions might increase user's acceptance of a variety a safety features such as the seat belt and netting, as well as the seat belt speed limiter. Publicizing the number of fatalities and serious injuries resulting from crashes with unrestrained riders might be a good start. The degree to which the general population of ROV users is aware of the severity of the problem is unclear. However, based on the number and type of misinformed statements made during the course of the study as well as the overall use patterns of the ROV drivers it is clear that most ROV users are missing critical safety information that might prevent a fatality.

Finally, the evidence suggests that limiting the speed of the ROV to 10 mph when the driver is unrestrained was generally not acceptable to users. Most drivers reached speeds close to or slightly above 10mph under all simulated study conditions. Participants in the current study seemed to select speeds and were more willing to accept a limit of 15 – 20 mph for study tasks. Most participants felt that while this range of speeds (15 – 20 mph) was not fast enough to warrant wearing a seat belt under test condition, the 15-20 mph speed was more acceptable than the 10 mph limit, allowing them to accomplish tasks in a more timely manner. In general, participants indicated that riders would be more likely to accept the limited speed if it were set slightly higher than 10 mph, and less likely to find way to by-pass the limiter or work around it.

## References

# 7

Consumer Product Safety Commission’s “Proposed Rule: Recreational Off-Highway Vehicles (ROV).” <http://www.cpsc.gov/Global/Newsroom/FOIA/CommissionBriefingPackages/2014/SafetyStandardforRecreationalOff-HighwayVehicles-ProposedRule.pdf>. 24, Sept. 2014

## Moderator Guide

### USER ACCEPTANCE AND EFFECTIVENESS OF SEAT BELT SPEED LIMITERS ON RECREATIONAL OFF-HIGHWAY VEHICLES

Project Number: 6000.02 Task 1: Field Trial Focus Groups

#### MODERATOR GUIDE

## 1. Review Purpose, Objective, and Scope of the Focus Group

[Use name tags with first names]

### Introductions and rules

- Moderator introduces self and aides

The purpose of this focus group is for us to learn more about how people are using their off – road vehicles (ROVs) and seat belts. The Federal Government would like to explore the feasibility of using restraint system requirements related to seat belt speed limiter technology in all recreational off-road vehicles. The overall objective of the of the study is to explore the system’s potential effectiveness, as well as user acceptance issues, and factors that would increase the likelihood of drivers accepting this type of device in their vehicles.

You have been selected to participate in this focus group because you indicated that you are a regular user of an off-road vehicle. We would like to understand how you use your vehicle, what specific safety features you have, and how/if you use them. We also want you to try out a specific feature that exists on the CanAm Commander 1000. This feature is known as a speed limiter.

The speed limiter system does not prevent vehicle motion, but limits the speed to 6 mph if the driver is not wearing a seat belt. You will get an opportunity to try out this feature shortly and share your opinions about the limiter with us.

How many of you have taken part in a focus group?

Before we begin our discussion, I would just like to review some basic issues and guidelines.

- a. Focus groups have certain rules or etiquette that we follow
  - i. No one will be judging your responses
  - ii. We need to hear about your feelings and opinions. We are not here to reach consensus, but to hear and discuss a range of views. There is no “right” or “wrong” answers.
  - iii. We want to encourage cross talk among group, not to/from moderator; the moderator will merely guide the discussion to cover the topics we need to hear about.
  - iv. We want to give everyone the opportunity to speak – it is important to hear from everyone.
  - v. The session is being audio-taped for offline analysis; participation is voluntary.
  - vi. Refreshments, rest rooms, and breaks are available and planned.
- b. We hope that you will feel free to be completely honest in this discussion. Your responses will NOT be shared with anyone other than those people working on the project. Your name and any other identifying information will not be used in any report that we prepare about these focus groups.
- c. Please respect the privacy of the other people in this group by not discussing what is said here with anyone outside the group or in public..
- d. Our objective is to gain insights on how people would feel about this type of system. As we go through the session, I will guide us along various topics, but you are the **experts** and will be doing most the talking.

## 2. Self-Introductions and Ice Breaker

Go around to each person in turn.

Round of introductions of participants (first names) –

- a. What is the make and model of the ROV that you own?
- b. How long have you owned the ROV and how often do you use it?
- c. What kind of features does it have? Have you made any special modifications been made to it?
- d. Can you describe ways that you use it?
  - Recreational
  - Work
  - Both
  - Other

### 3. Pre-Ride Discussion

#### Driving Behavior

- a. What types of terrain do you usually travel over?
  - i. Surfaces (grass, mud, sand, gravel, ruts and bumps)
  - ii. Slopes (up and down, along the side)
- b. How do you decide how to handle hills and cross slopes?
- c. While driving your ROV, what are the specific activities or tasks that you try to accomplish?
- d. What kind of maneuvers do you make while driving your ROV?
- e. What are your typical speeds?
- f. How often do you ride alone vs. with other riders?
- g. Have you ever had any accidents or close calls?
  - Do you know of others who have?

#### Seat Belt Use

- a. If you have a seat belt system in the vehicle, under what conditions do you usually use it? Or not use it?
  - i. How often?  
(*Never*)
    - i. Can you explain why you do not to use the seat belt?
      1. Uncomfortable
      2. Inconvenient
      3. Not dangerous
      4. No need
      5. Experience/Driving Ability
      6. Other
    - ii. Can you think of any driving conditions where you would use a seat belt?
- c. Do you think wearing a seat belt changes the speeds at which you drive? How?
- d. What do you feel is the likelihood that you will be involved in a crash/rollover while driving your ROV? Under what conditions?
- e. Do you feel that a seat belt would provide you with some protection during a crash?
  - i. How effective do you think a seat belt would be if you had some kind of accident?

### 4. Hands-On Field Task

Now, I would like you each to have some experience driving the ROV and with the Speed Limiter. Each of you will go outside with \_\_\_\_\_ and have an opportunity to drive the Commander. We have set up a circuit comprised of several “stations” separated by various distances. When you reach a station we will ask you to accomplish a task that will require you to get out of the ROV. For example, you will drive out to a station (possibly a hoop with a number of golf balls lying in the

center of it) and retrieve one item from it. You will need to exit the vehicle, retrieve the item, and then get back in and drive back to the starting point.

Once you get outside, you receive brief instruction on the key controls on the ROV (e.g., gas, brake, seatbelt, gear shift). I will ask that you do not speak to each other about your experience with the Commander until everyone has had an opportunity to drive it.

Once you all have participated in this exercise, we will come back here and I will ask you to provide some feedback on your experiences.

See document titled “6000.02 Hands-On Field Task Script”

## **5. Post-Task Discussion**

### **General discussion on tasks and performance**

- a. Describe your experience with the Commander as you performed the task under the various conditions?
  - a. Self-Selected speed
  - b. 10 mph limit
  - c. 15 mph limit
  - d. 20 mph limit
- b. Were any of the 3 unbelted trial speeds similar to speeds that you drive when on your own ROV?
- c. Would you typically wear a belt when traveling at any of those speeds?
- d. If you were belted, would you have selected a higher traveling speed?
- e. Of the 3 unbelted trial runs, would you have been more comfortable wearing a seat belt?
  - a. Did you feel unsafe at any time?

### **Seat belt Use**

- a. Did wearing the seat belt impact your ability to complete the tasks?
  - a. If so, how?
- b. Relative to these tasks, under what conditions would you elect to use your seat belt?
  - a. Why?
    - i. Steep inclines?
    - ii. Higher speeds?

## **Seat belt Speed Limiter**

- a. Were you ever frustrated while performing the tasks during the hands-on exercises?
  - a. If so, why?
- b. Did the presence of the seat belt speed limiter influence your ability to conduct specific tasks or activities?
  - a. If so, how?
- c. Would the presence of this system change your behavior with regard to wearing a seat belt?
  - a. Why? Or Why not?
- d. How would you feel about the seat belt speed limiter as a feature in your ROV?
  - a. What are the pros?
  - b. What are the cons? Are there any unintended consequences?
- c. Do you feel that the limit of 6 mph is set for a reasonable speed for unbelted drivers?
  - a. Why? Or Why not?
    - i. What about?
      1. 10 mph
      2. 15 mph
      3. 20 mph
    - ii. Do you think it should be set at a higher speed? If so, what is a reasonable speed for unbelted drivers?
- d. Knowing what you know now, how would the presence of a speed limiter feature in the vehicle influence your decision to use a seat belt?
  - a. Full time?
  - b. Part time?
  - c. Under various conditions?
- e. How would the presence of a speed limiter influence your decision to purchase this type of vehicle in the near future?

### ***If impression overall is negative, then ask***

- f. What might make your impression shift in the opposite direction?
- g. What changes to the system design would improve it?
  - a. Why?
- h. If there was a speed limiter on your ROV, would you disable it?
  - b. How?

## **Passenger Seat belt use**

- a. How often do you ride alone vs. with passengers
  - i. Who?
  - ii. When?

- b. For those of you who drive with passengers, do your passengers typically wear a seat belt?
  - i. If yes, How often?
  - ii. If not, do you know why?
- c. Do you feel the presence of the seat belt speed limiter as a feature in your ROV influences their belt use?
  - i. Why?
  - ii. Why not?
- d. Do you require your passenger to wear a seat belt?
  - i. Why?
  - ii. Why not?

### **Alternative Ideas**

- a. Can you suggest any other ideas that might improve people's willingness to wear seat belts?

## **6. Wrap-up**

Would anyone have anything else they would like to mention about seat belt speed limiter system before we conclude the focus group? Are there any issues that we have not touched on?

### **Closing Remarks**

Thank you for your time. What we have heard and learned about today will help us assess the feasibility of this system as an effective way to reduce injuries related to crashes.

- Instruct participants as to how they will be reimbursed for their time.

## Field Experimenter Guide

### USER ACCEPTANCE AND EFFECTIVENESS OF SEAT BELT SPEED LIMITERS ON RECREATIONAL OFF-HIGHWAY VEHICLES

Project Number: 6000.02 Task 1: Field Trial Focus Groups  
HANDS-ON FIELD TASK SCRIPT

[Read sections 1 and 2 of the script in a location where the video will be visible (i.e. not too much sunlight). Make sure to **start the camera** before reading the instructions. ]

#### 1. Basic Information & Instructions on ROV Operational Controls

[Point out the vehicle parts as they are discussed]

*This side-by-side has a throttle and brake pedals, a steering wheel, ignition, and gear selector for controlling where and how fast you go. The speedometer above the dash will show you how fast you're going. It has seatbelts and side curtains. Both of these use buckles to latch them and a red button to release them. The belts and side curtains are intended to keep you, your arms and your legs inside the vehicle in case a rollover occurs.*

*Although the maximum speed of this ROV is over 65 MPH, we will not be going that fast. In fact, today we will be experiencing the vehicle's seatbelt activated speed limiter. If the driver does not use the seatbelt, the system will limit the top speed to 6-9 MPH.*

*We have devised a means to simulate a limiter with higher speed thresholds that we'd also like you to experience. These thresholds include 10, 15, and 20 MPH. However for these speeds we will allow you to drive without your seatbelt buckled. We only want you to approach these speeds on the straight sections of the course, NOT as you're turning around on the corners.*

*For safety purposes, the person riding with you will have the ability to engage the speed limiter and slow your speed to the original 6-9 MPH max.*

*Please keep your hands, arms, and legs inside the vehicle at all times. If the vehicle should start to tip over because of a hard turn, a hill, or rough terrain, keeping completely inside the roll cage is your best protection against being crushed under the vehicle as it rolls. And, of course, do your best to prevent it from rolling.*

## 2. Specific Task Instructions

Ahead of you are a set of different stations that you will drive to. Each station is marked by a hula-hoop and cone. At each station there are golf balls in a bucket. At the station, we want you to:

- Completely exit the ROV
- Retrieve the golf ball, return back to the ROV
- Drive back to your starting point, where we would like you to exit the ROV, and deposit the golf ball in the bucket.

Then we want you drive to the next station, exit the ROV, get a golf ball, return to the starting point, exit the ROV and drop the golf ball in the bucket. You will do this until you have visited each station and retrieved all of the golf balls. Please watch this video for a demonstration of the tasks. We want you to perform this retrieval task for total of 4 different times under different conditions. Make sure you remember to put the ROV in park each time you stop to exit the vehicle!

[Show demonstration video and let them know they can use the cup holder in the ROV to hold the golf balls while they are driving from station to station.]

## 3. Conduct Trials / Passes

### A. Trial Run – Self paced to get a feel for driving the ROV

### B. Pass 1 – Self Selected Speed- Confirm the bolt is all the way out.

1. During this first pass, you will need to buckle your seat belt and you can travel at any speed you choose, so long as it is less than 30 mph.

Ask participant about their initial reaction to the task and the use of the seat belt.

*How did you feel about the task you were asked to perform?*

*Did the use of the seat belt impact your ability in any way?*

*At what speed do you estimate you were driving?*

### C. Pass 2 – 10 mph – Turn the bolt all the way down to the jam nut.

During the second pass, you will be asked to unbuckle your seat belt. For this pass, you will travel at a speed of 10 mph.

Ask participant about their initial reaction to the task and the speed of the ROV.

*How did you feel about the task you were asked to perform?*

*What is your initial reaction to driving the ROV at 10 mph?*

### D. Pass 3 – 15 mph- Back the bolt out by $\frac{3}{4}$ of a turn.

During the third pass, again you will be unbelted and this time you will travel at a speed of 15 mph.

Ask participant about their initial reaction to the task and the ROV's speed of travel.

*How did you feel about the task you were asked to perform?*

*What is your initial reaction to driving the ROV at 15 mph?*

**E. Pass 4 – 20 mph- Back the bolt out by 1 full turn.**

2. *During the fourth and final pass, you will be unbelted and this time you will travel at a speed of 20 mph.*

Ask participant about their initial reaction to the task and the ROV's speed of travel.

*How did you feel about the task you were asked to perform?*

*What is your initial reaction to driving the ROV at 20 mph?*

**4. Wrap-up for Hands- On Field Task Portion**

*Thank you for your participation in the test drive portion of the focus group. [Read as needed] I am going to ask that you wait \_\_\_\_\_ (point to planned destination) while the other participants complete the same tasks that you performed. After everyone has completed this portion, we will return to the meeting room and have a brief discussion regarding your experience today.*