

**LOG OF MEETING  
DIRECTORATE FOR ENGINEERING SCIENCES**

SUBJECT: Recreational Off-Highway Vehicles (ROVs) – Meeting requested by the Recreational Off-Highway Vehicle Association (ROHVA) to discuss their progress in developing voluntary standard requirements that address occupant protection and vehicle stability.

DATE OF MEETING: December 15, 2010

PLACE OF MEETING: U.S. Consumer Product Safety Commission, Bethesda, MD

LOG ENTRY SOURCE: Caroleene Paul, ESME *CP*

COMMISSION ATTENDEES: See attached attendance list

NON-COMMISSION ATTENDEES: See attached attendance list

SUMMARY OF MEETING:

Representatives of the Recreational Off-Highway Vehicle Association (ROHVA) met with CPSC staff to discuss ROHVA's progress in developing voluntary standard requirements that address occupant protection and vehicle stability.

CPSC staff opened the meeting by setting the following ground rules:

- ROHVA requested this meeting with CPSC staff so, although the meeting was public, discussions were limited to ROHVA representatives and CPSC staff/representatives.
- The opinions or views expressed by CPSC staff were not reviewed or approved by the Commission and may not reflect the views of the Commission.
- The discussions during the meeting will be treated as comments to the ongoing rulemaking and will become part of the public record.

ROHVA representatives presented an overview of their approach to addressing occupant protection in ROVs, their position on static and dynamic vehicle testing as it applies to ROVs, and revisions they have made to labeling requirements. Presentations were made by ROHVA, Dynamic Research Inc. (DRI), and Applied Safety and Ergonomics Inc. (see attached presentation).

The following points were made regarding occupant protection:

- The voluntary standard will introduce four Zones of protection with design and/or performance requirements:
  - Zone 1 – Leg/Foot area will require a 4 inch high (from the floor) barrier that must withstand a 50 lbf outward force and have no opening greater than 3 inches in diameter.
  - Zone 2 – Shoulder/Hip area will require a barrier that withstands a 100 lbf outward force or the ROV shall pass a 45 degree tilt of the vehicle with a seat



lead to tripped rollovers (berms from dirt build-up or ruts or any number of other off-road terrain features).

- CPSC staff asked if all the vehicles ROHVA tested passed the RRR test. ROHVA replied that all passed. CPSC staff asked if any ROVs on the market would fail the RRR test. DRI declined to reply.
- CPSC staff asked if more test data to support ROHVA's proposals will be received when the ballot for revisions to the voluntary standard is sent to canvass members. ROHVA replied yes.

The following points were made regarding ROV labeling requirements:

- Applied Safety and Ergonomics gave a presentation on labeling requirements and development work they did to revise the labeling requirements for ROVs. Their effort included ROV accident analysis and analysis of driver behavior during focus groups where drivers completed a closed loop driving course.
- CPSC staff asked for a copy of the full report on the focus group work.

ROHVA reviewed the progress of an ROV E-course that is available online. A hands-on course is under development and estimated to be completed by the end of the summer.

ROHVA summarized that over the course of two years of meetings and exchanges with CPSC staff, ROHVA has tried to meet CPSC's challenges. ROHVA believes they have achieved this through their efforts with training, labeling, dynamic testing, and occupant protection testing.

MEETING ATTENDANCE RECORD  
ROHVA / CPSC Staff – December 15, 2010

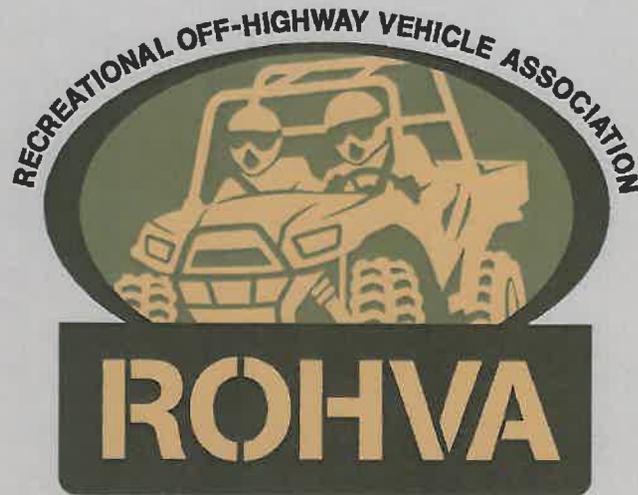
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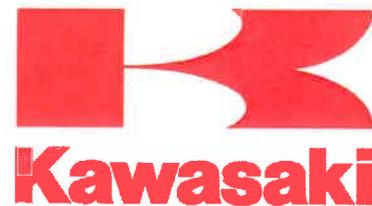
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**ROHVA Update:  
Standards Development and Safety Programs**

Presented to  
U.S. Consumer Product Safety Commission  
Technical Staff  
December 15, 2010

# Recreational Off-Highway Vehicle Association

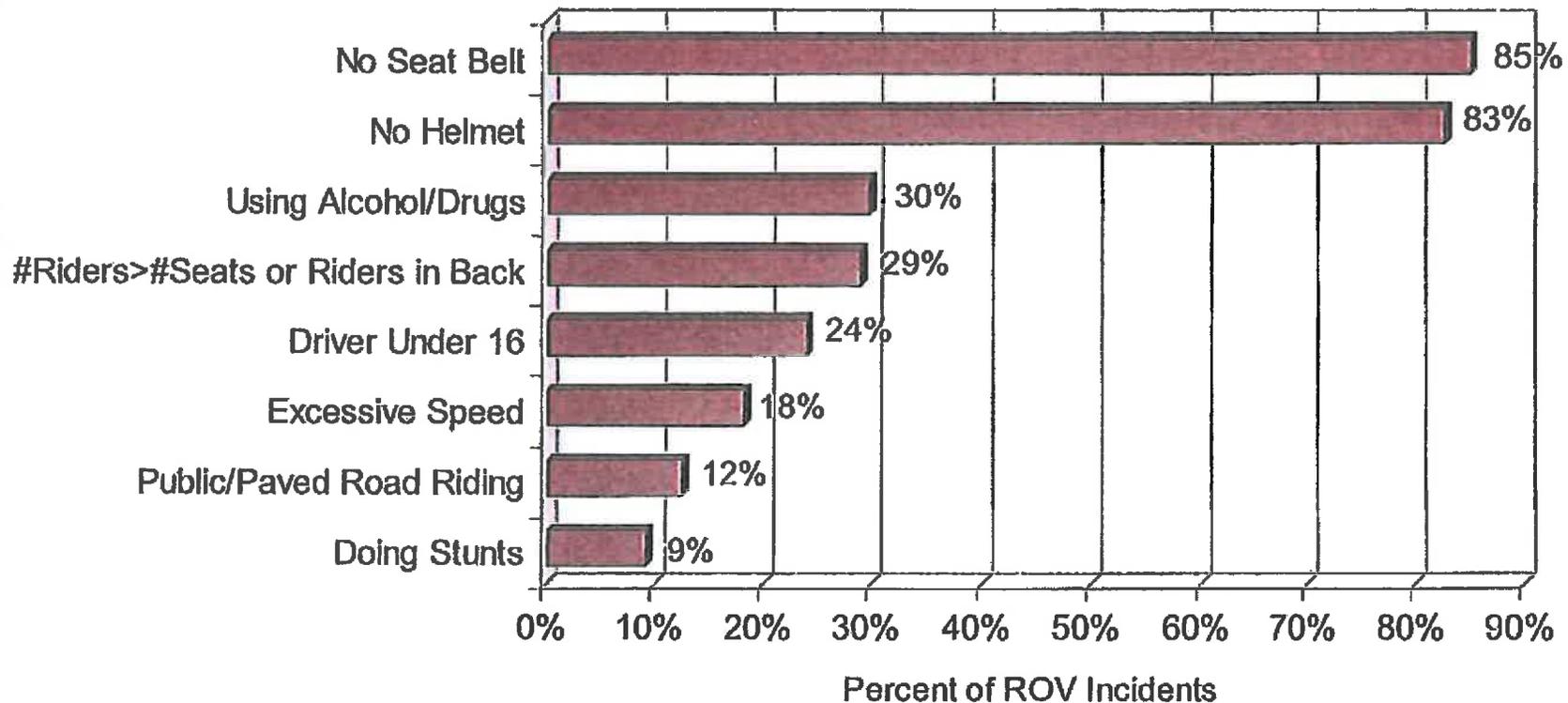


All Major Manufacturers Represented By ROHVA

# Review of Top Incident\* Factors



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION



**ROHVA Focus: Fact & Data Based Standards Development**

\* Heiden Analysis

# ROHVA's Comprehensive Safety Action Plan



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Vehicle Voluntary Standard

1. **Mandatory Static *and* Dynamic Stability Standards**
2. **Mandatory Occupant Retention Performance Standards**
3. **Mandatory Restraint Warning System**
4. **Vehicle Class to Meet CPSC Area of Interest**

## Occupant Behavior

1. **Mandatory Helmet and Seatbelt Use**
2. **Standardized Warning Labels**
3. **Free E-Course Training**
4. **Hands-On Training**

**Significant Progress in All Areas  
Prepared to Canvass Updated Standard**

# ANSI/ROHVA 1-201X Anticipated Schedule



- **Draft to be approved by ROHVA Board of Directors and sent to Consensus Body**
  - December 2010
- **Approved and published by ANSI**
  - Mid 2011 (MY 2012)
  - Effective in 2 Model Years (MY 2014)
- **Resume work to continue evolution of the standard**
  - Immediately upon ANSI approval and publication

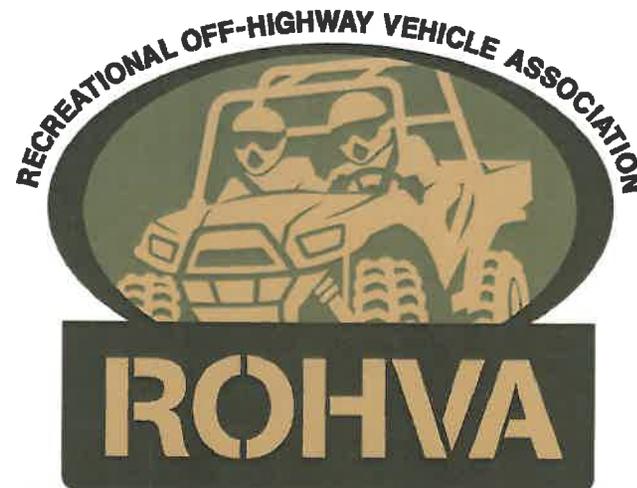
**Seeking CPSC Feedback**

# Jan Rintamaki



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

**Chairman, ROHVA Board of Directors  
Polaris Industries Inc.**



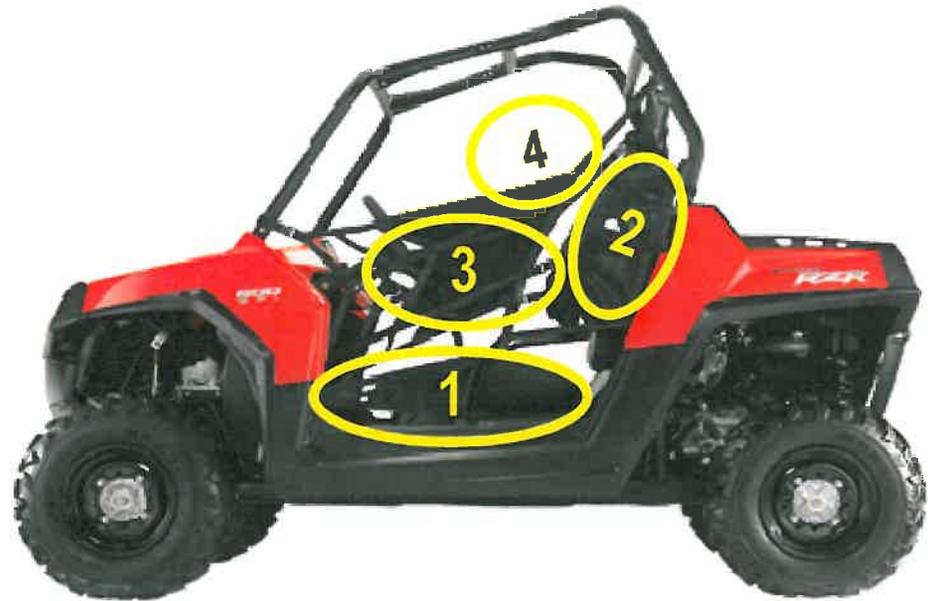
# ANSI/ROHVA 1-201X Highlights



## Occupant Retention System (ORS)

### Zone-Based Approach to ORS

- Zone 1 – Leg/Foot
- Zone 2 – Shoulder/Hip
- Zone 3 – Arm/Hand
- Zone 4 – Head/Neck



**Comprehensive System of Passive & Active Restraints  
In Response to CPSC**

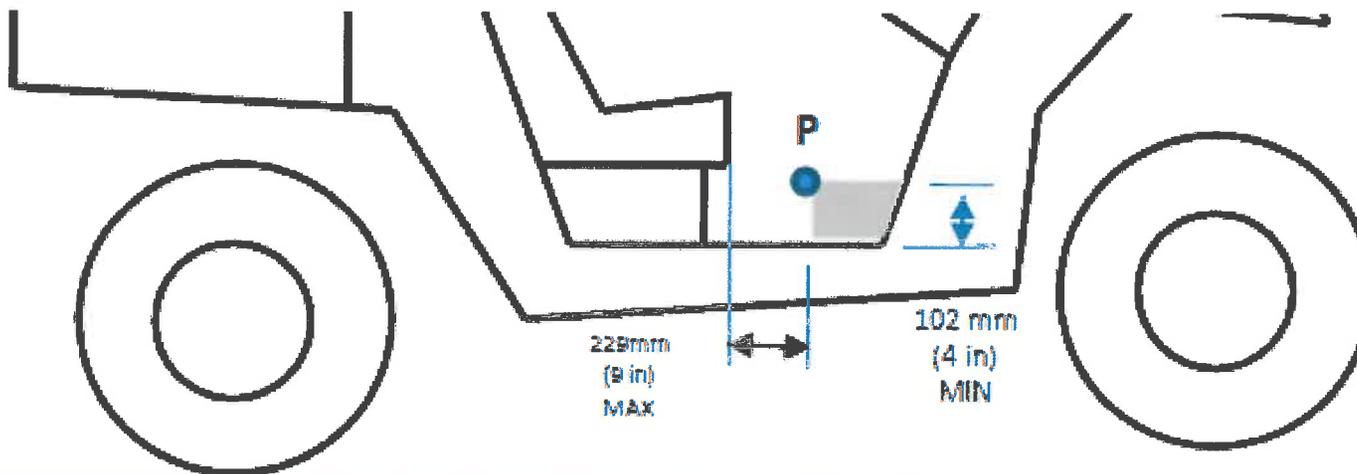
# Occupant Retention System



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Zone 1 – Foot / Leg

- **Obstruction at least 4" high from bottom of floor**
  - Rear opening no more than 9" long
- **Must withstand 50 lbf force using 3" diameter probe**
  - No opening greater than 3" in diameter



**Balances Ingress / Egress with Retention**

# Occupant Retention System



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VEHICLE ASSOCIATION

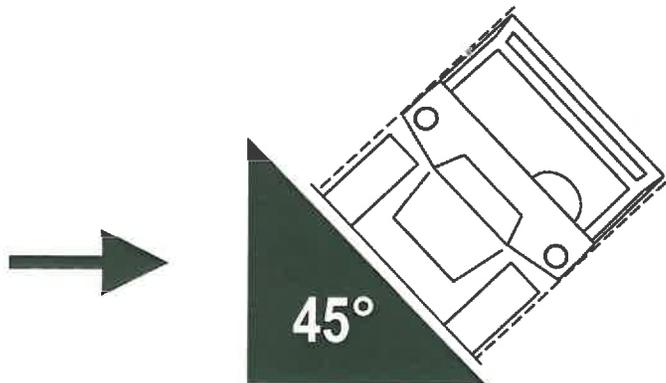
## Zone 2 – Shoulder / Hip

### Construction basis:

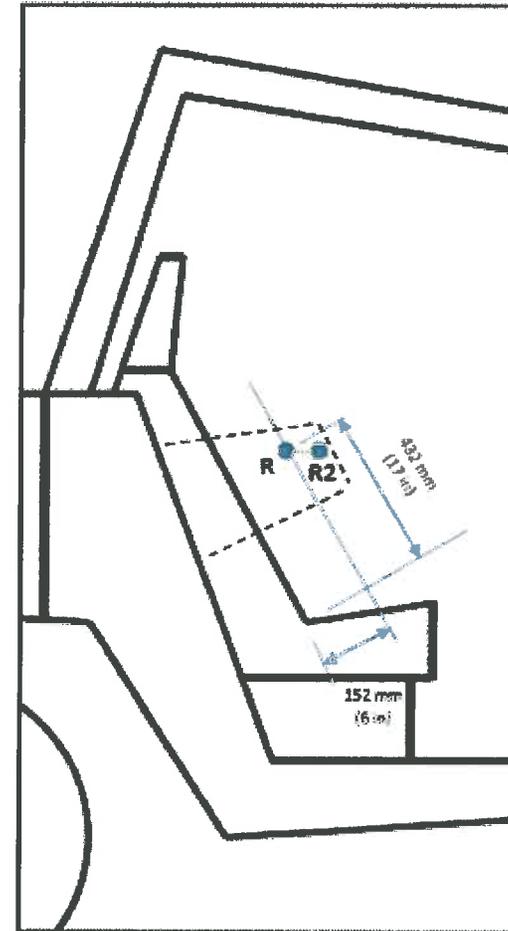
- Barrier shall cover points R & R<sub>2</sub>
    - Must withstand 100-lbf outward force,
- OR

### Performance basis:

- Tilt ROV with belted test dummy to 45°
  - No torso excursion > 5" beyond ROV width



Not to Scale



**Construction or Performance: Allows For Innovation**

# Occupant Retention System



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VEHICLE ASSOCIATION

## Zone 3 – Arm / Hand

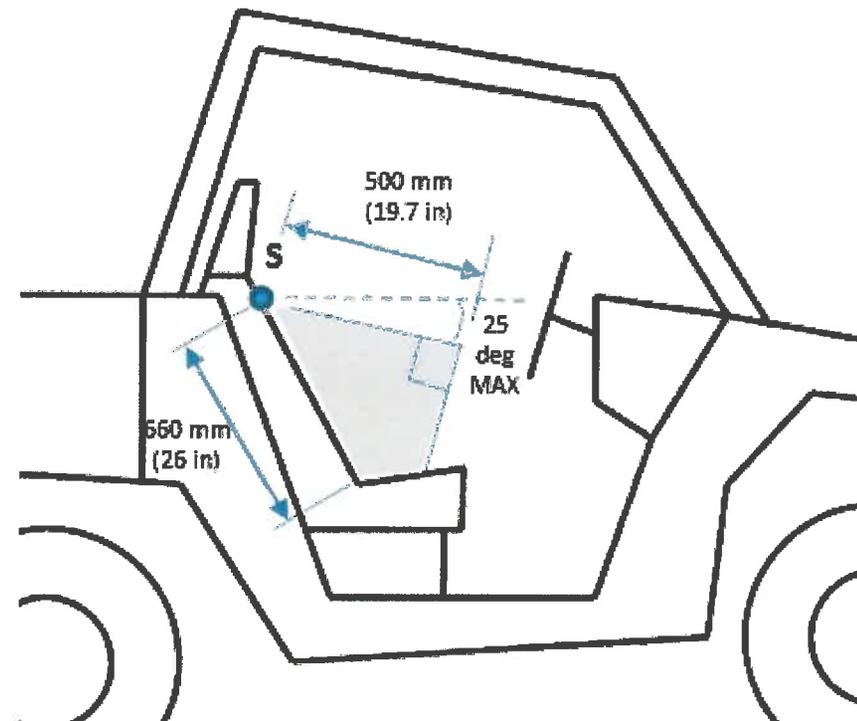
### Construction basis:

- Barrier shall cover shaded area
  - Must withstand 50-lbf outward force using 3" probe
  - No opening greater than 3" diameter

OR

### Performance basis:

- Tilt ROV with belted test dummy to 45°
  - No arm or hand excursion > 7" beyond ROV width



Not to Scale

**Balances Retention with Need for Mobility**

# Occupant Retention System



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Seat Belts

- Minimum 3-point restraints for all seats
- Mandatory Restraint Warning System illuminated for at least 8 seconds

## Handholds

- Each outboard seating position must have one handhold
- Performance criteria accounts for restrained occupant and assumes reasonable grip strength



**ROVs are Rider-Interactive**

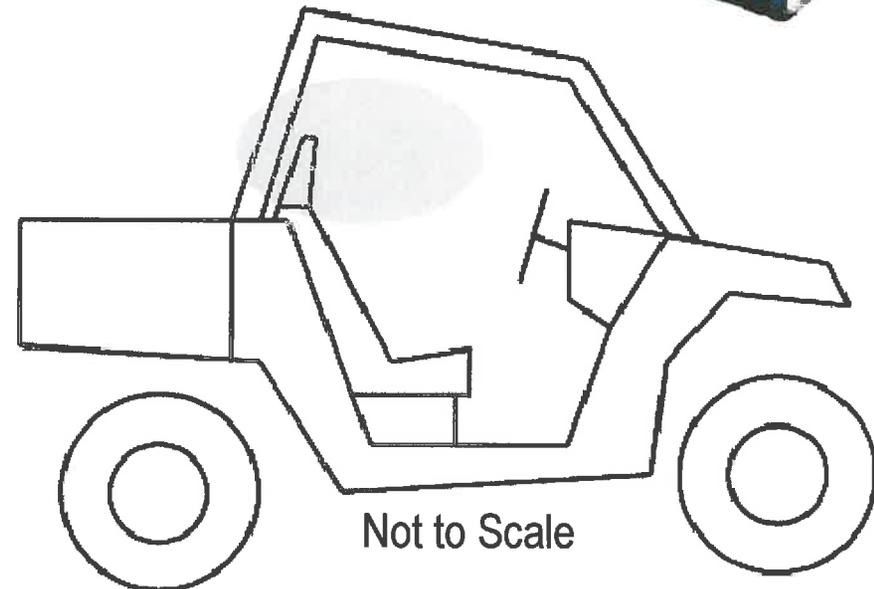
# Occupant Retention System



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Zone 4 – Head

- **Mandatory helmet use**
- **Also reinforced in:**
  - Main warning label
  - ROV education programs
  - Owner's manuals
  - Promotional materials
- **In addition:**
  - Model legislation proposed
  - Mandatory in many states



**Must Not Obstruct Operator Visibility w/ Helmet On**

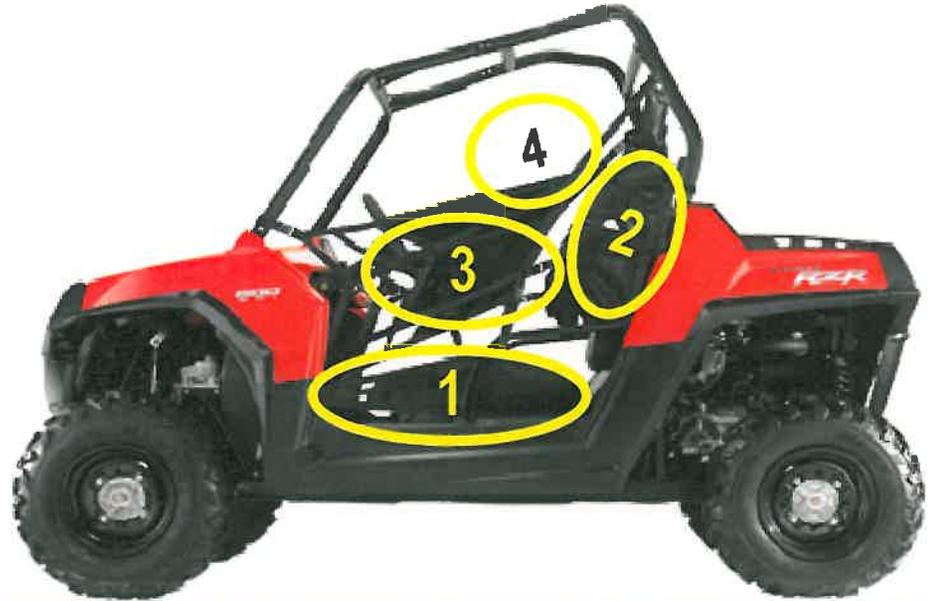
# ANSI/ROHVA 1-201X Highlights



## Occupant Retention System (ORS)

### Zone-Based Approach to ORS

- Zone 1 – Leg/Foot
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**Comprehensive System of Passive & Active Restraints  
In Response to CPSC**

# ANSI/ROHVA 1-201X Highlights



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Static Stability

- **Tilt-Table (Roll)**
  - 24° @ GVWR: +20% > ANSI/ROHVA 1-2010
  - 30° @ Curb Weight + 2 occupants: +7% > ANSI/ROHVA 1-2010
- **Tilt-Table (Pitch)**
  - 28° @ GVWR: +12% > ANSI/ROHVA 1-2010

**ANSI/ROHVA 1-201X: More Rigorous  
In Response to CPSC**

# ANSI/ROHVA 1-201X Highlights



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Dynamic Stability :

### ROV Rollover Resistance Test (RRR)

- On clean, dry asphalt (for repeatability only)
- Curb Wt. + Wt. of 2 Occupants (incl. test equip. and any ballast)
- Radius – 25' @ centerline
- Determine Ackerman steering-wheel angle
- Vehicle in most open drivetrain setting
- Instrumented vehicle with Data Acq. system
  - Sensor, D/A system criteria
  - Data-processing criteria
- Vehicle-condition and test-data record sheets



**ANSI/ROHVA 1-201X: Dynamic Stability Requirement  
In Response to CPSC**

# ROV Rollover Resistance Test (RRR)



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Pass / Fail Criteria

- Set & hold steering wheel to Ackerman angle
- Start vehicle from rest
- Slowly increase speed until ROV achieves:
  - **PASS:** 0.6g lateral acceleration without Two-Wheel Lift (TWL),  
OR
  - **PASS:** Vehicle becomes speed limited
  - **FAIL:** TWL occurs at  $< 0.6g$
- Repeat 5 times on each side
- Vehicle must **PASS** at least 8 of 10 runs



Dynamic Stability Requirement  
In Response to CPSC

# RRR Pass/Fail Criteria



**ROVs must also pass 3 Static Lateral Stability Standards (2 Tilt Table and Kst) plus all other elements of standard**

## Rationale

- **0.6g is greater than the avg. off-highway tire/soil lateral force coefficient**
- **Specifies rollover resistance off-highway**
  - **Low speed rollovers (Key CPSC focus in ANPR)**
  - **Ability to restrict vehicle from these situations needs to be encouraged**
- **Non-TWL limits are appropriate indicators of rollover resistance in combination with comprehensive stability criteria**
  - **Current design/technologies, e.g. vehicle design & architecture**
  - **Future design/technologies, e.g. stability enhancement**



**Encourages Continued Innovation**

# Dynamic Research, Inc.

Commissioned by ROHVA



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

**John Zellner**  
Technical Director

**John Lenkeit**  
Technical Director

Dynamic Research, Inc.

## TOPICS

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- Comparison of steer characteristics with roll resistance results
- Overview of dynamic ROV roll resistance test procedure
- Summary results

## **COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS**

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- Purpose is to compare understeer/oversteer characteristics with limit lateral acceleration characteristics
  - Nature of limit
  - Value of limit lateral acceleration

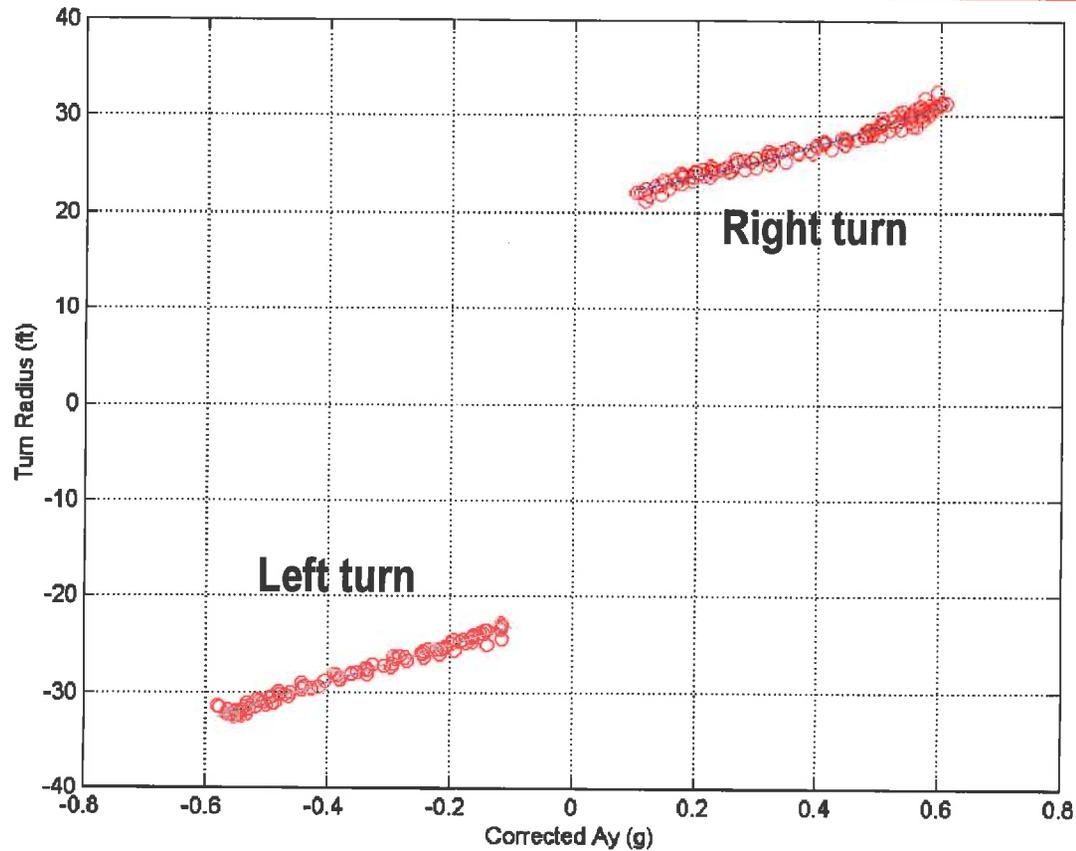
**In Response to CPSC**

## APPROACH

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- Using data recorded during roll stability tests:
  - Speed
  - Yaw rate
  - Wheelbase
- Determine:
  - Understeer gradient (USG) at maximum lateral acceleration
  - Maximum lateral acceleration
- Cross-plot limit lateral acceleration values with USG to explore potential relationships

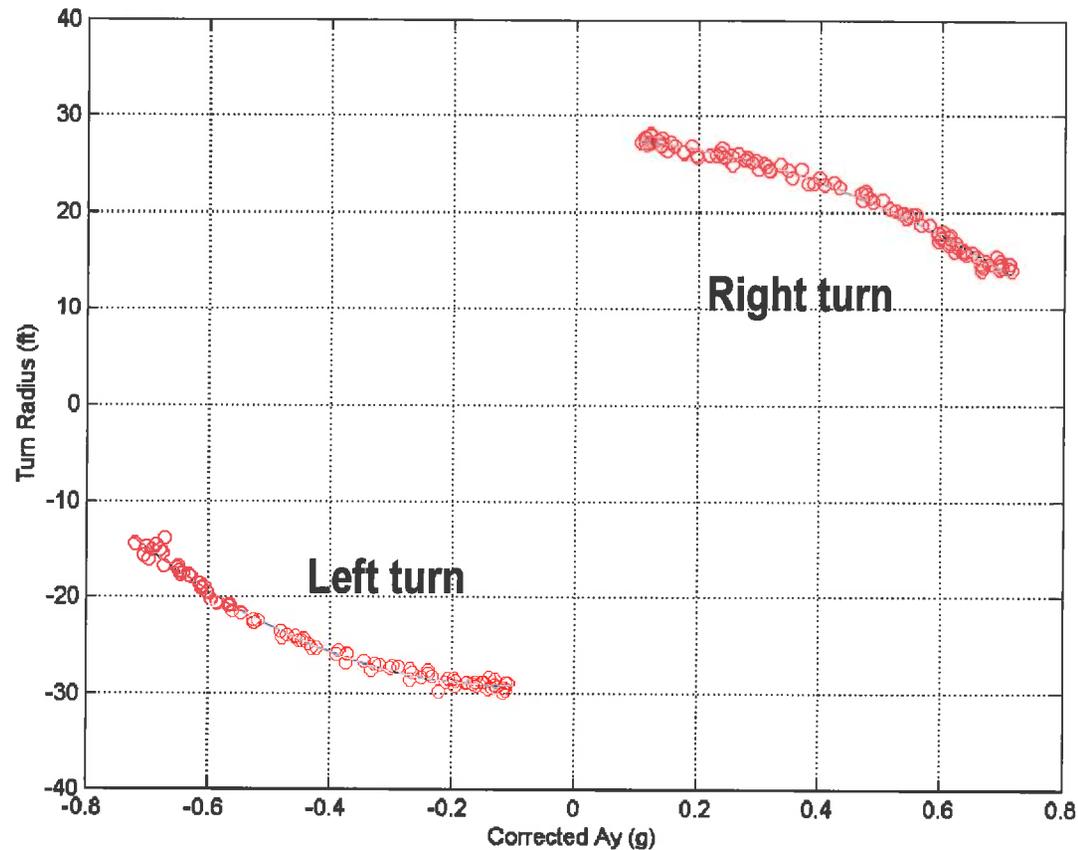
# COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS



Understeer Example Turn Radius versus Corrected  $A_y$

**Understeer Example: Increasing Radius**

# COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS

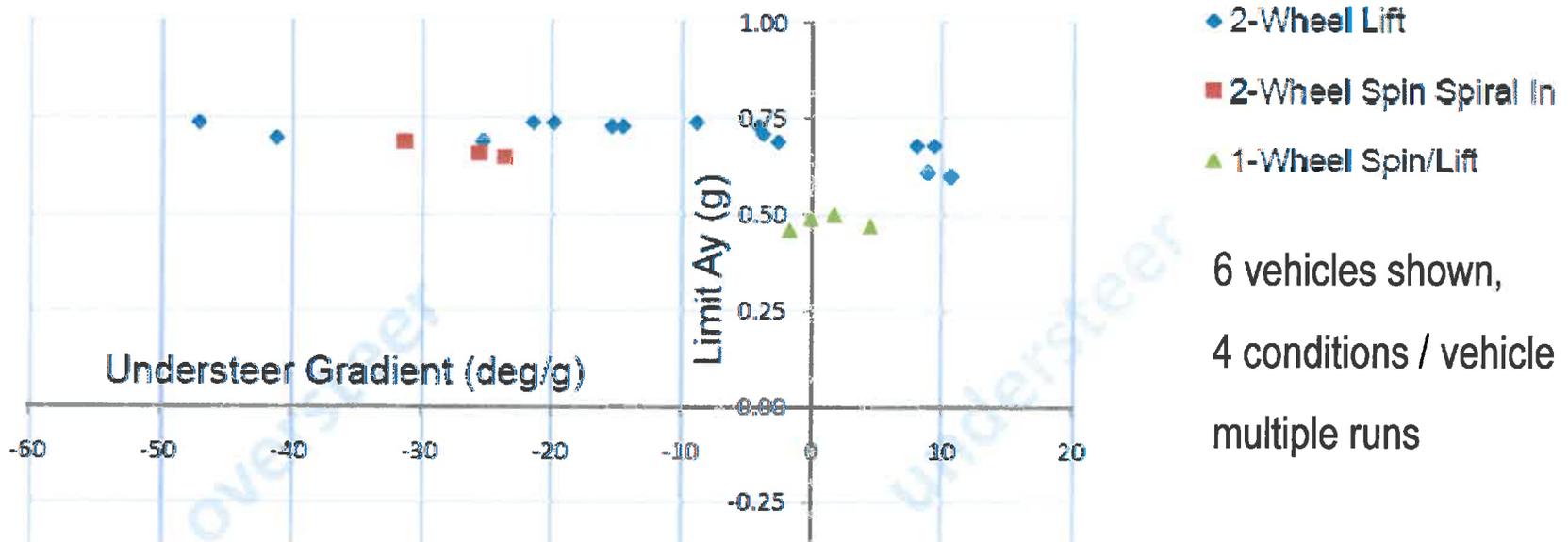


Oversteer Example Turn Radius versus Corrected Ay

**Oversteer Example: Decreasing Radius**

## COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS (Right Turn)

### Limit Ay versus Understeer Gradient at Limit

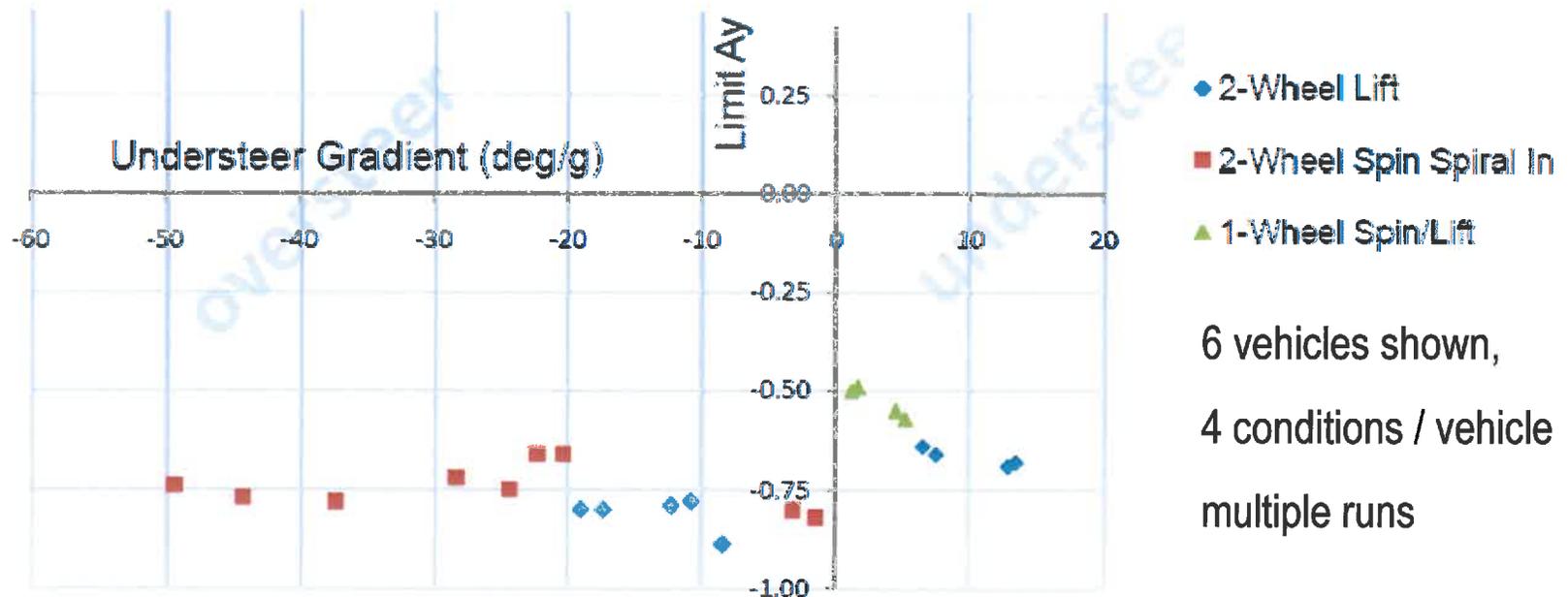


### Understeer / Oversteer:

- Has no effect on 2 wheel lift
- Has no effect on limit lateral acceleration

**TWL Occurs for Both Oversteer & Understeer**

## COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS (Left Turn)



### Understeer / Oversteer:

- Has no effect on 2 wheel lift
- Has no effect on limit lateral acceleration

**TWL Occurs for Both Oversteer & Understeer**

## ADDITIONAL OBSERVATIONS

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### Oversteer / understeer:

- Is highly dependent on test surface
- Asphalt results  $\neq$  Off-highway results

### Understeer gradient and ROV roll resistance:

- Are independent characteristics of a vehicle
- Both in theory and in practice

### ROV roll resistance methodology:

- Is indicative of off-highway results on very high friction soils
- Permits use of asphalt surfaces for repeatable testing purposes, while minimizing negative design influences for off-highway use

# OVERVIEW OF DYNAMIC ROLLOVER RESISTANCE TEST PROCEDURES

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## Specifications for:

- Test surface
- Vehicle condition
- Test equipment
- Data acquisition
- Sensors
- Data processing

## Delivers Results that are:

- Repeatable
- Reproducible
- Quantitative

**Sound Scientific Methodology**

# OVERVIEW OF DYNAMIC ROLLOVER RESISTANCE TEST PROCEDURES

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## Test procedure

- Steering wheel angle:
  - Front wheel steer angle for 25' radius (in response to CPSC comments)
- Mechanical stop to hold steering fixed
- Slowly accelerate,  $\leq 1$  mi/h/s
- Continue until:
  - 0.6 g reached, or
  - Further increase in throttle does not increase vehicle speed or
  - 2-wheel lift
- At least 5 runs in each direction

**Repeatable, Reproducible & Straightforward**

# SUMMARY TEST RESULTS @ 20' RADIUS

Vehicle	Loading	Steer Angle	Direction											
			Left						Right					
			Mean Ay(g)	No.	Range	Min	Max	Speed (mph)	Mean Ay(g)	No.	Range	Min	Max	Speed (mph)
1	Light	low speed radius	-0.78	5	0.07	-0.81	-0.74	14.15	0.69	13	0.02	0.68	0.7	12.7
		Ackermann	-0.77	5	0.15	-0.82	-0.67	16.3	0.7	5	0.01	0.7	0.71	13.64
	Nominal	low speed radius	-0.74	6	0.11	-0.78	-0.67	13.77	0.73	5	0.05	0.71	0.76	13.15
		Ackermann	-0.74	5	0.03	-0.76	-0.73	14.89	0.74	5	0.03	0.72	0.75	14.08
2	Light	low speed radius	-0.68	5	0.02	-0.69	-0.67	17.52	0.6	6	0.01	0.6	0.61	15.42
		Ackermann	-0.69	5	0.05	-0.71	-0.66	19.05	0.61	5	0.03	0.6	0.63	16.17
	Nominal	low speed radius	-0.66	5	0.04	-0.68	-0.64	16.73	0.68	5	0.03	0.66	0.69	16.67
		Ackermann	-0.64	5	0.02	-0.65	-0.63	17.76	0.68	6	0.05	0.66	0.71	18.37
3	Light	low speed radius	-0.57	5	0.09	-0.63	-0.54	13.88	0.47	5	0.03	0.46	0.49	12.84
		Ackermann	-0.55	5	0.05	-0.58	-0.53	13.33	0.46	5	0.03	0.46	0.49	12.11
	Nominal	low speed radius	-0.49	6	0.03	-0.51	-0.48	12.86	0.5	5	0.05	0.48	0.53	13.2
		Ackermann	-0.5	5	0.02	-0.51	-0.49	12.29	0.49	5	0.04	0.47	0.51	12.47
4	Light	low speed radius	-0.87	5	0.05	-0.89	-0.84	19.35	0.73	5	0.01	0.72	0.73	15
		Ackermann	-0.89	5	0.02	-0.9	-0.88	18.69	0.73	5	0.04	0.71	0.75	15.08
	Nominal	low speed radius	-0.8	5	0.01	-0.8	-0.79	15.91	0.74	5	0.02	0.73	0.75	15.15
		Ackermann	-0.8	5	0.03	-0.82	-0.79	16.23	0.74	5	0.03	0.72	0.75	15.04
5	Light	low speed radius	-0.72	5	0.03	-0.74	-0.71	14.63	0.66	5	0.04	0.65	0.69	13.21
		Ackermann	-0.75	5	0.07	-0.78	-0.71	16.26	0.65	5	0.03	0.63	0.66	13.58
	Nominal	low speed radius	-0.66	5	0.01	-0.67	-0.66	14.3	0.66	5	0.02	0.65	0.67	12.45
		Ackermann	-0.66	5	0.03	-0.68	-0.65	14.89	0.69	5	0.07	0.66	0.71	13.77
6	Light	low speed radius	-0.82	5	0.04	-0.84	-0.8	17.79	0.69	5	0.02	0.68	0.7	14.75
		Ackermann	-0.8	5	0.14	-0.86	-0.72	21.21	0.71	5	0.05	0.69	0.72	15.81
	Nominal	low speed radius	-0.79	5	0.02	-0.8	-0.78	16.36	0.73	5	0.02	0.72	0.74	14.93
		Ackermann	-0.78	5	0.04	-0.79	-0.75	17.54	0.74	5	0.03	0.73	0.76	16.76
Average:			-0.71		0.05			16.07	0.66		0.03		14.43	

1 wheel spin/lift  
2 wheel lift  
2W spin/spiral-in
one 2W spin/spiral-in, plus four 2 W lift  
one 2W lift, plus five 2W spin/spiral-in

**Similar Results Expected and 12% Increase in Speed w/ Proposed 25' Radius**

# Applied Safety and Ergonomics, Inc.

Commissioned by ROHVA



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## J. Paul Frantz, Ph.D., C.P.S.M., CPE

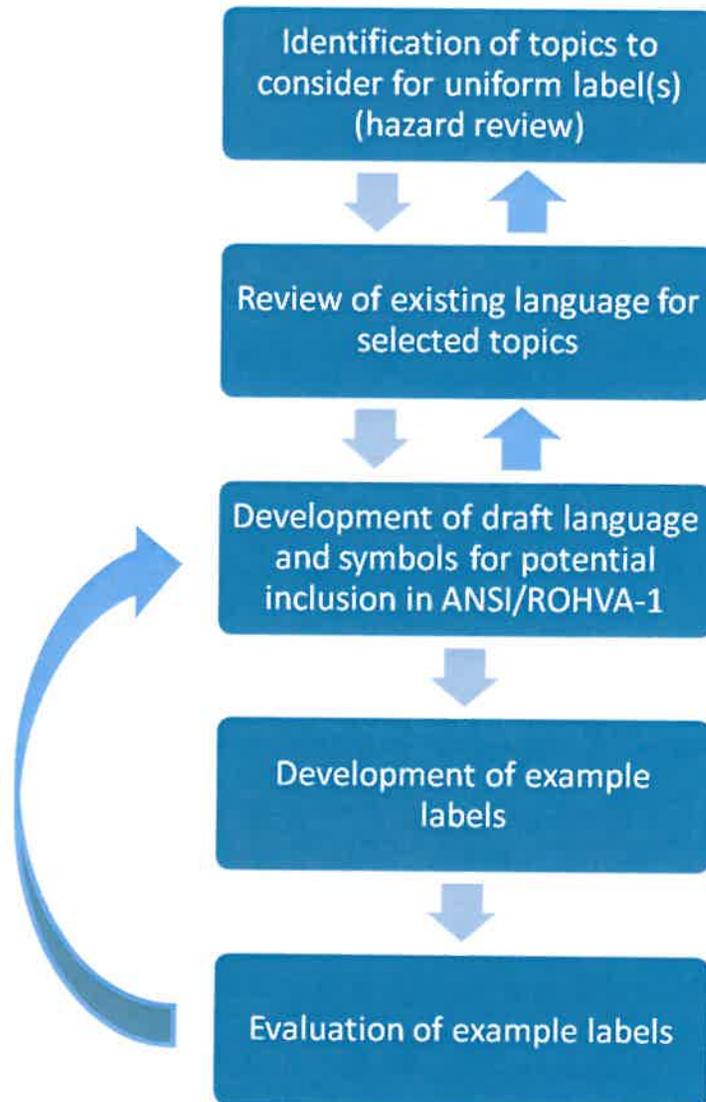
Senior Consultant/Co-Founder



APPLIED SAFETY AND ERGONOMICS, INC.

# ANSI/ROHVA 1-201X

## Revision of Labeling Requirements



# Standardized / uniform messages

- Broader base of experience/information
- Input from more parties
- More uniform safety messages for owners/users
- More uniform messages for distribution by agencies and educators
- More uniform messages for state and local laws and enforcement

SUV

This is a multipurpose passenger vehicle which will handle and maneuver differently from an ordinary passenger car, in driving conditions which may occur on streets and highways and off road. As with other vehicles of this type, if you make sharp turns or abrupt maneuvers, the vehicle may rollover or may go out of control and crash. You should read driving guidelines and instructions in the Owner's Manual, and WEAR YOUR SEATBELT AT ALL TIMES.

1984

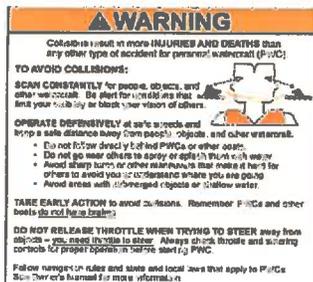


1999

PWC

ATV

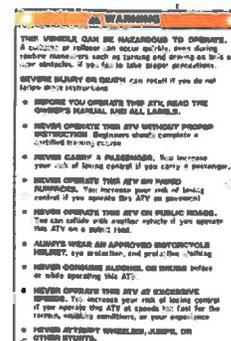
Automobiles



2001



1988



1998/2008



2000

# State Laws and Public Ride Area Rules Are Not Uniform

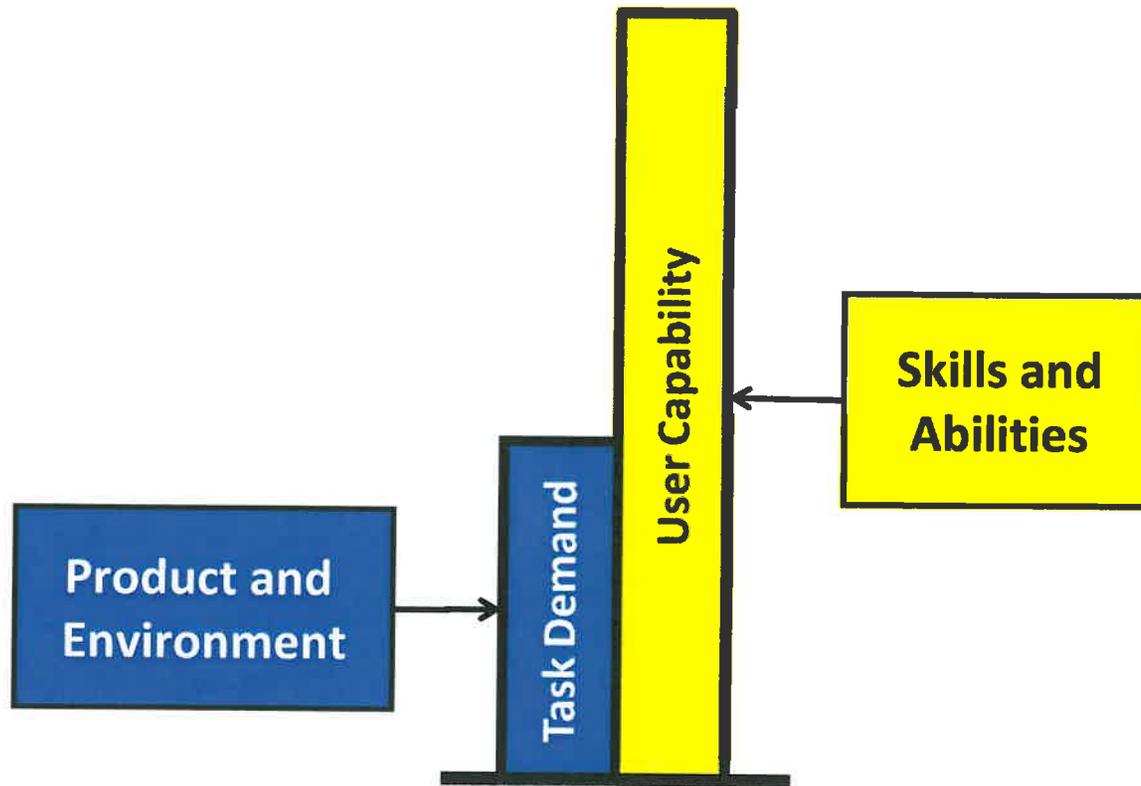
## Varying definitions and laws for ROVs:

- Seatbelts
- Helmets
- Age requirements
- Driver's license requirements

# ROV Accident Analysis

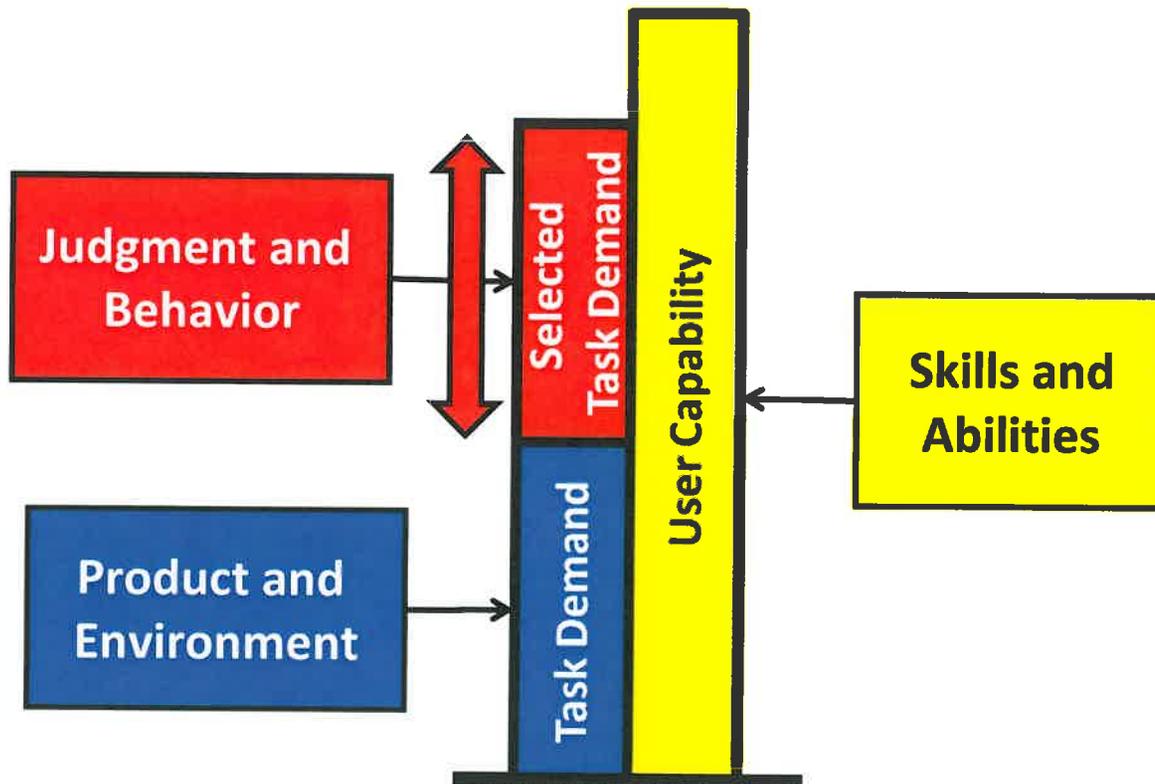
- CPSC Analysis of IDIs in ANPR
  - 69% of the incidents appeared to have involved rollover
  - 71% not using the seat belt or wearing it improperly
  - 96% not wearing a helmet or wearing it improperly
- Heiden Associates Analysis of IDIs
  - “In a significant number of these accidents, the rollover or overturn occurred when the driver was attempting a dangerous maneuver, such as fishtails or doughnuts...or making a sharp turn or a turn at excessive speed.”

# Basic Task-Capability Model



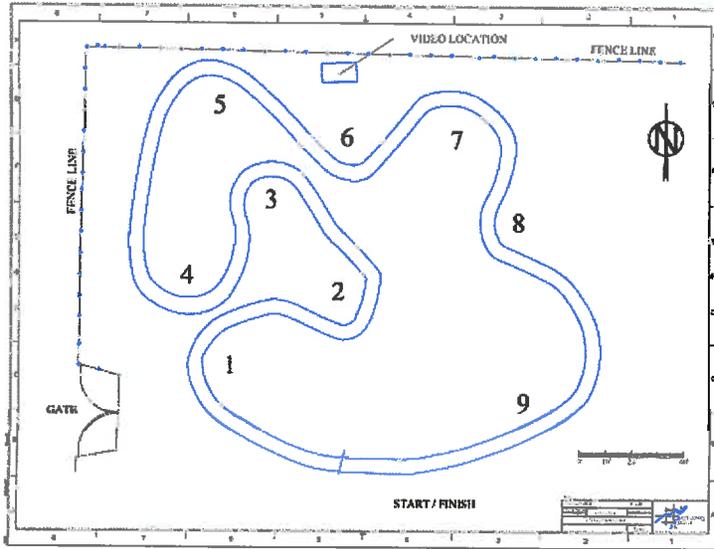
Adapted from: Kinnear, N., Stradling, S., and C. McVey (2008), in *Driver Behaviour and Training*, Vol. III  
Fuller, R., and J.A. Santos (2002), in *Human Factors for Highway Engineers*

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Fuller, R., and J.A. Santos (2002), in *Human Factors for Highway Engineers*

# Analysis of ROV Driver Control and Turning



## Pre-Turn

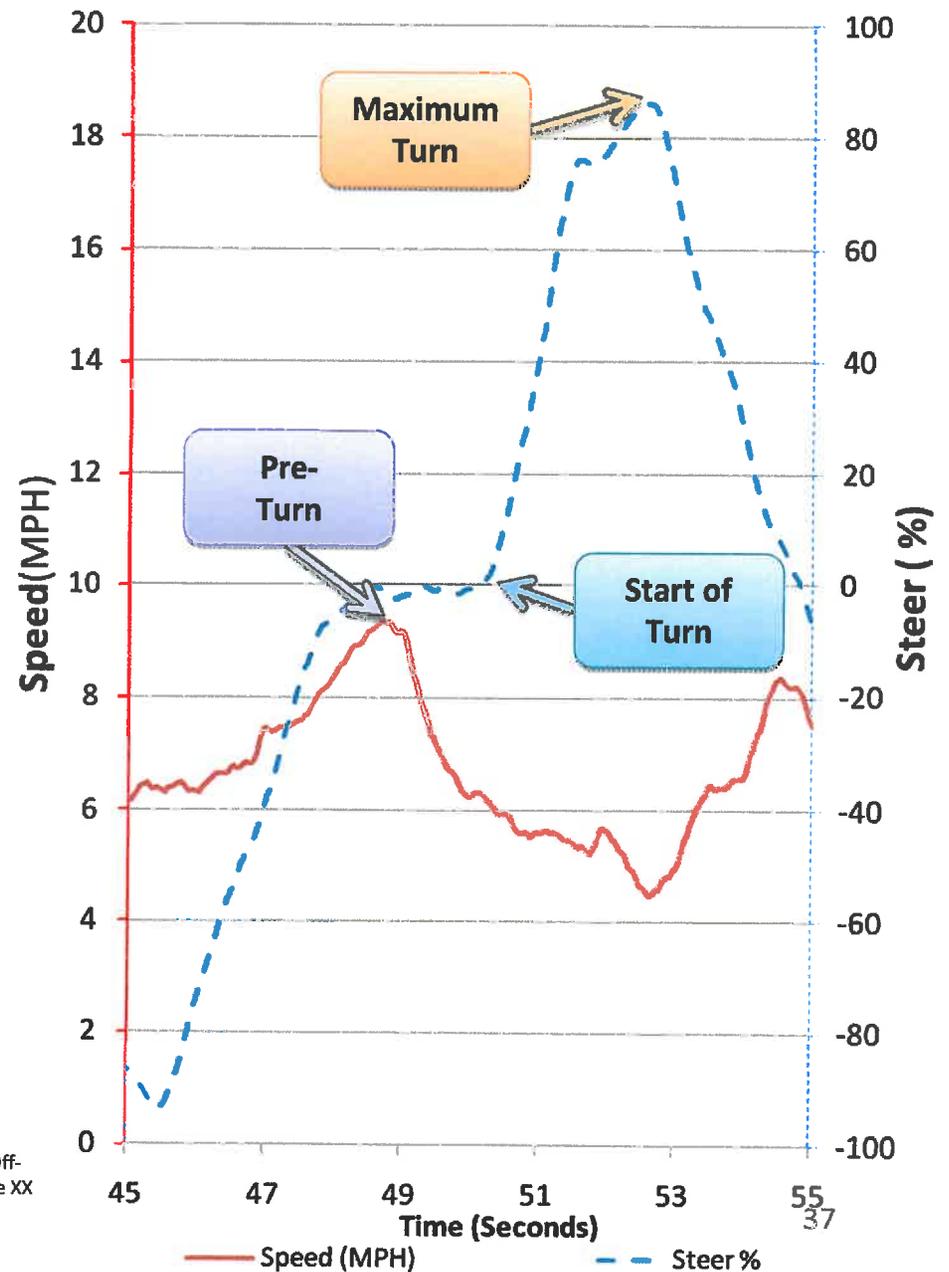
Maximum speed prior to starting a turn.

## Start of Turn

The start of the turning motion.

## Maximum Turn

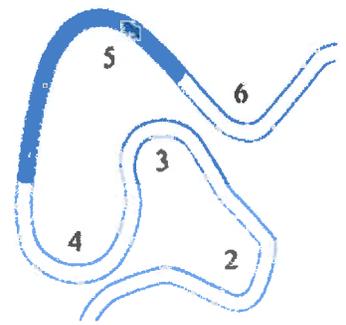
Peak steering wheel input during the turn.



Frantz, J.P., Burhans, C.G., and Breen, K.C. (2008). Demonstration and Description of Yamaha Rhino Novice Operation.

Frantz, J.P., Burhans, C.G., and Breen, K.C. (2008). Comparing Driver Descriptions of Turning to Measures of Off-Road Vehicle Performance: Implications for Driving Instruction and Accident Investigation. Proceedings of the XX Annual International Society for Occupational Ergonomics and Safety, pp. 247-252

# Analysis of ROV Driver Control and Turning

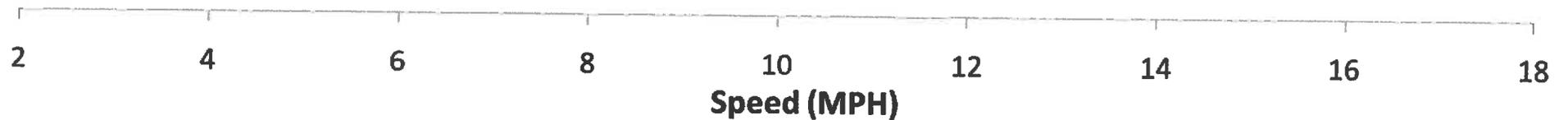
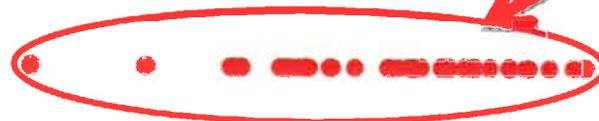


**Turn 5:  
All Drivers Over 12 MPH Slowed Down**

**Speed at Start of Turn**

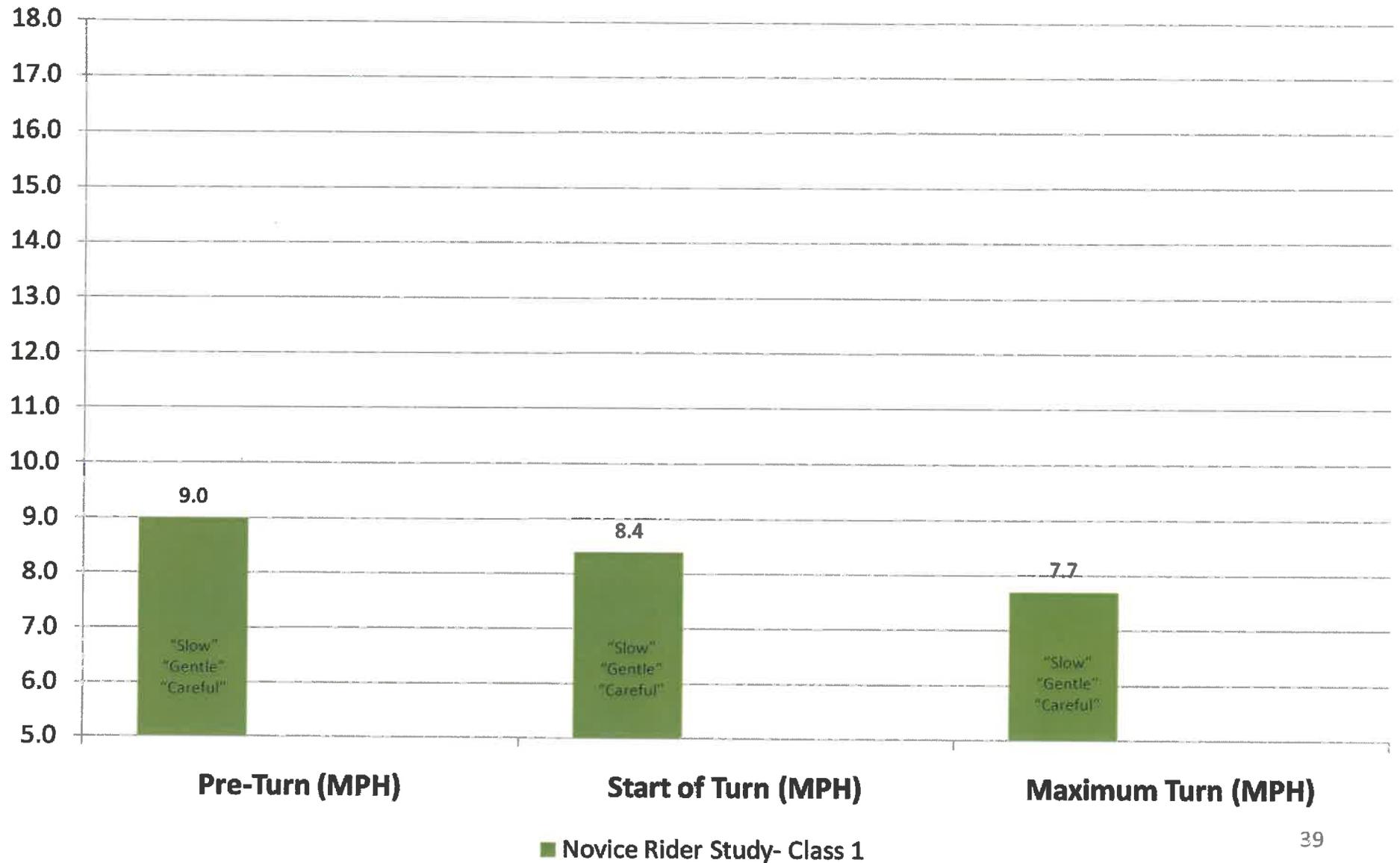


**Speed at Maximum Turn**



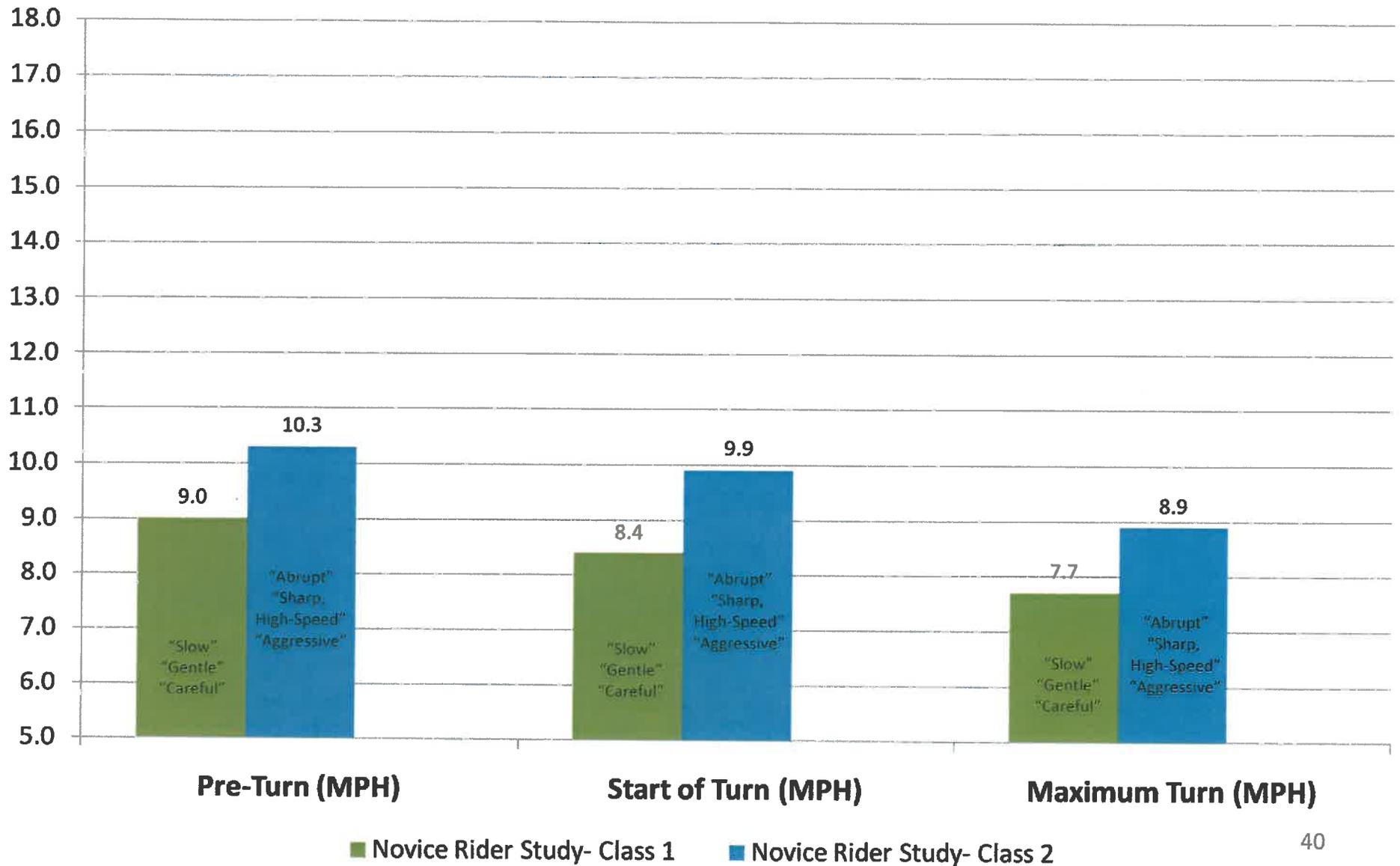
38  
\*39 Observations With Start of  
Turn Speed Over 12 MPH

# Analysis of ROV Driver Control and Turning



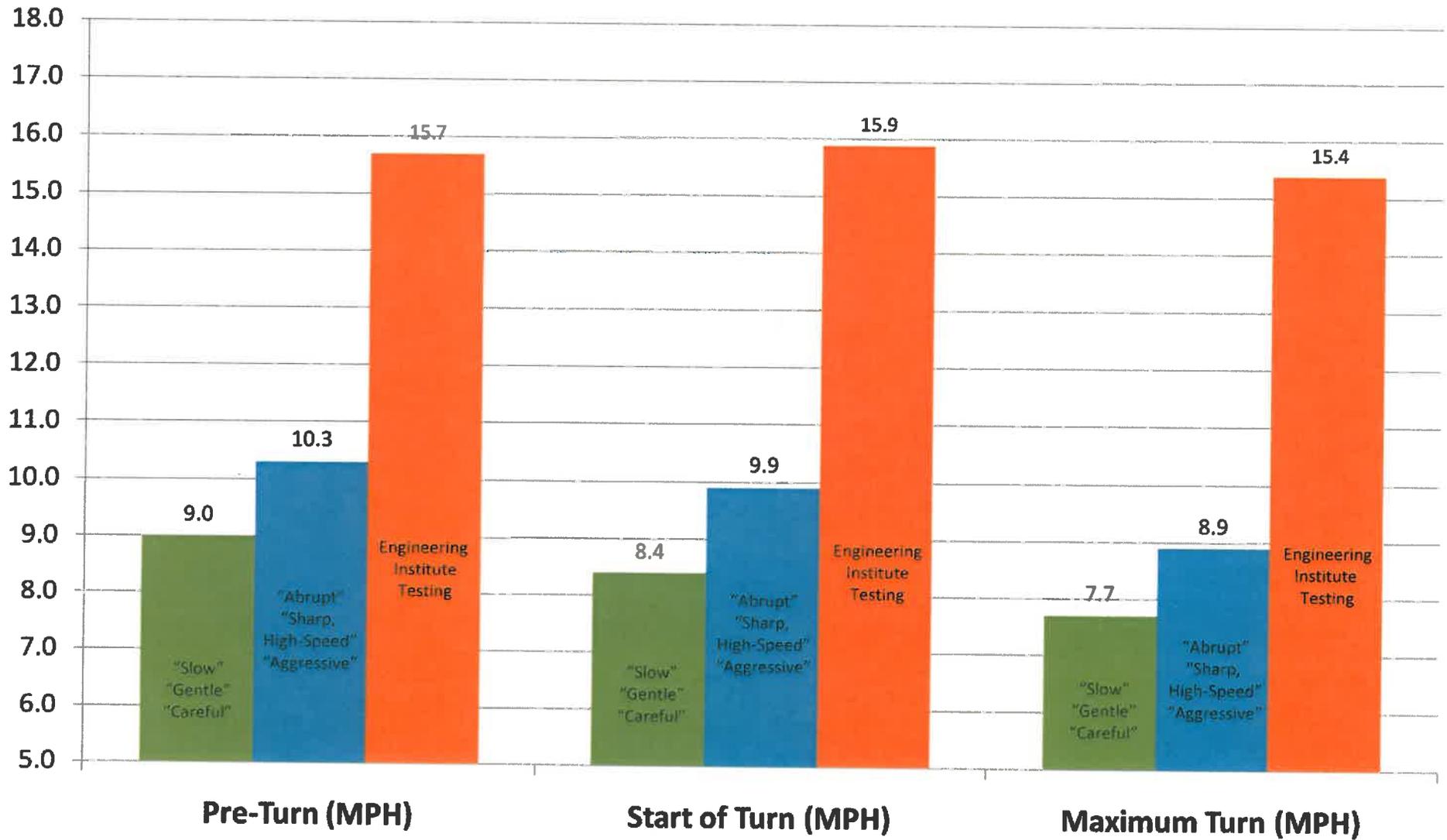
\*Novice Rider Turns with 50-65% Steer at Maximum Turn

# Analysis of ROV Driver Control and Turning



\*Novice Rider Turns with 50-65% Steer at Maximum Turn

# Analysis of ROV Driver Control and Turning



■ Novice Rider Study- Class 1

■ Novice Rider Study- Class 2

■ Engineering Institute Testing

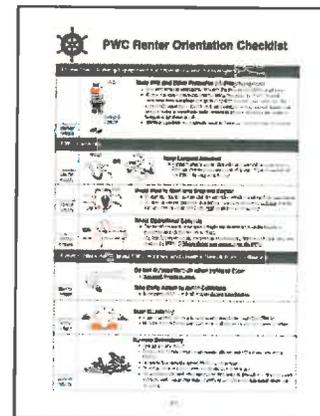
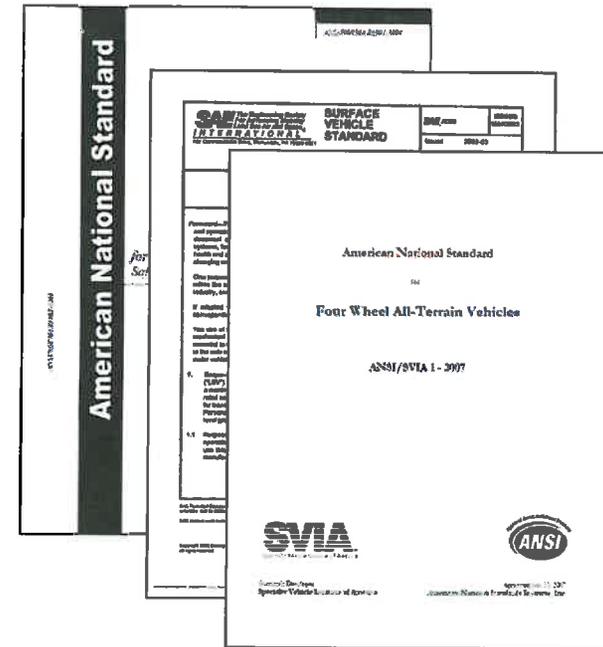
41

\*Novice Rider Turns with 50-65% Steer at Maximum Turn

# Review of Existing Language for Selected Topics

## Examples

- ROV Warning Labels
- ROV Owner's Manuals
- Vehicle Standards/Practices
- Vehicle Regulations



# ANSI/ROHVA Warning Label Topics

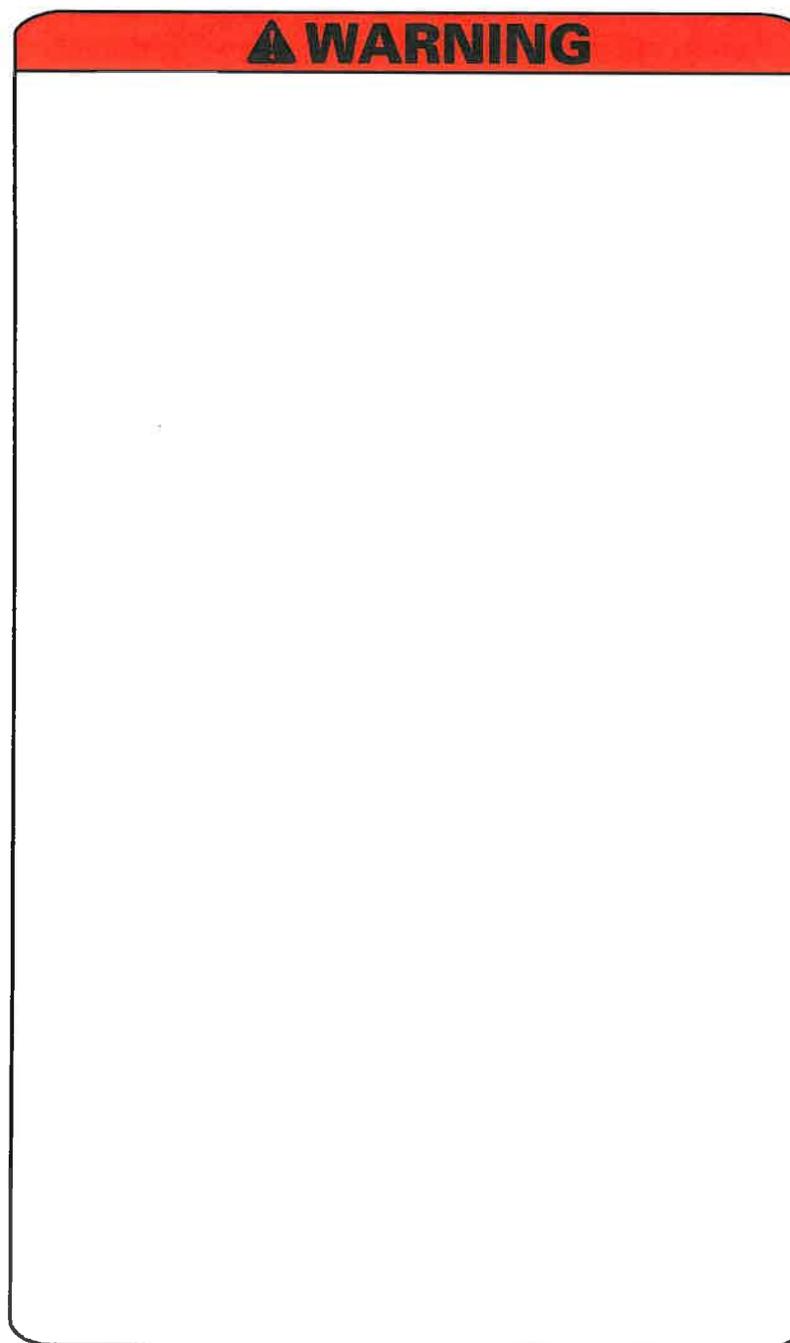
## Current Standard Content Areas

1. Operator/Occupant Restraint Usage
2. Tire Pressure
3. Occupant Protective Gear
4. Operator and/or Passenger Qualifications
5. Alcohol and Drug Use
6. Appropriate Use
7. Cargo Load Rating
8. Importance of Reading and Following the Owner's Manual

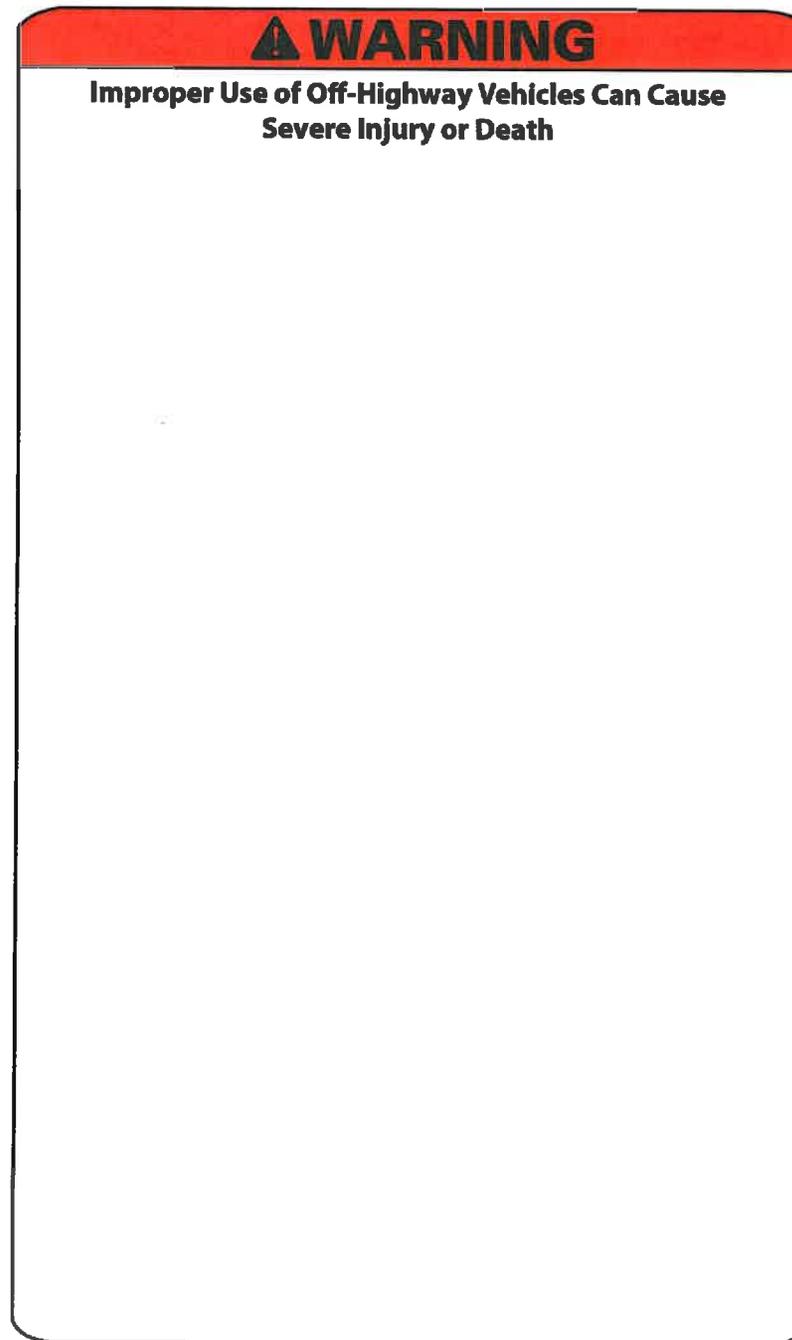
## Updated Standard Content Areas

1. Seat Belt Use
2. Helmet Use
3. Hazard and Consequence of Use
4. References to Manual
5. Use of Other Protective Gear
6. Drugs and Alcohol
7. Operator Qualifications
8. Passenger Qualifications
9. Use of Retention Devices (if applicable)
10. Care when Operating
11. Operation on Hills
12. Use on Paved Surfaces
13. Use on Public Roads
14. Staying Inside the Vehicle
15. Vehicle Occupant Seating
16. Overloading
17. Tire Pressure
18. Riding in the Cargo Bed

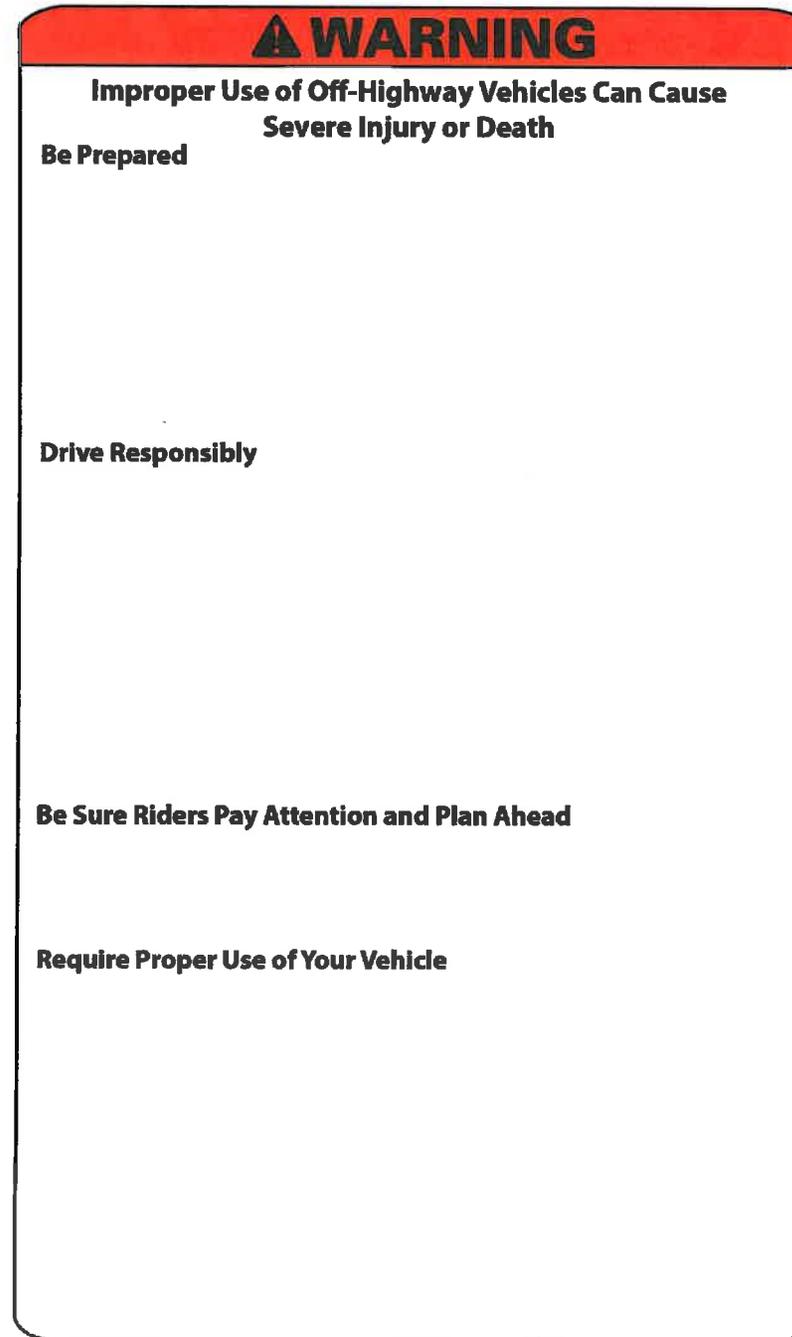
1. ANSI Z535.4 style



1. ANSI Z535.4 style
2. Vehicle class message



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.

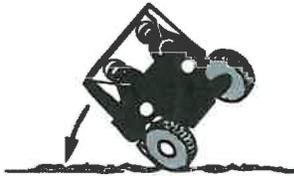
**⚠ WARNING**

**Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death**

**Be Prepared**



**Drive Responsibly**



**Rollovers have caused severe injuries and death, even on flat, open areas.**

**Be Sure Riders Pay Attention and Plan Ahead**

**Require Proper Use of Your Vehicle**



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.
5. General preparation

## **⚠ WARNING**

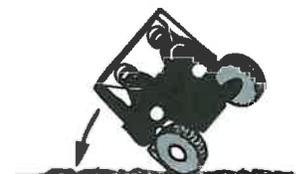
### **Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death**

#### **Be Prepared**

- Fasten seat belts.
- Wear an approved helmet and protective gear.
- [Reserved for message about other occupant restraint devices.]
- Each rider must be able to sit with back against seat, feet flat on floor [and foot rests], and hands on steering wheel or handhold[s], where equipped). Stay completely inside the vehicle.



#### **Drive Responsibly**



**Rollovers have caused severe injuries and death, even on flat, open areas.**

#### **Be Sure Riders Pay Attention and Plan Ahead**

#### **Require Proper Use of Your Vehicle**



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.
5. General preparation
6. Examples of responsible operation

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### **Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death**

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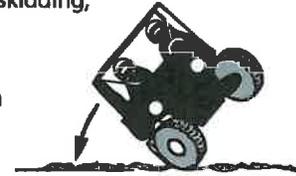
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#### **Drive Responsibly**

Avoid loss of control and rollovers:

- Avoid abrupt maneuvers, sideways sliding, skidding, or fishtailing, and never do donuts.
- Slow down before entering a turn.
- Avoid hard acceleration when turning, even from a stop.
- Plan for hills, rough terrain, ruts, and other changes in traction and terrain. Avoid paved surfaces.
- Avoid side hilling (riding across slopes).



**Rollovers have caused severe injuries and death, even on flat, open areas.**

#### **Be Sure Riders Pay Attention and Plan Ahead**

#### **Require Proper Use of Your Vehicle**



1. ANSI Z535.4 style
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3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.
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6. Examples of responsible operation
7. Support proper attention/response

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**Rollovers have caused severe injuries and death, even on flat, open areas.**

#### Be Sure Riders Pay Attention and Plan Ahead

If you think or feel the vehicle may tip or roll, reduce your risk of injury:

- Keep a firm grip on the steering wheel or handholds and brace yourself.
- Do not put any part of your body outside of the vehicle for any reason.

#### Require Proper Use of Your Vehicle



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.
5. General preparation
6. Examples of responsible operation
7. Support proper attention/response
8. Responsible ownership/encourage intervention/reduce risk multipliers

## ▲ WARNING

### Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death

#### Be Prepared

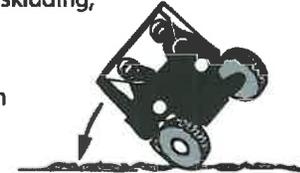
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#### Require Proper Use of Your Vehicle

Do your part to prevent injuries:

- Do not allow careless or reckless driving.
- Make sure operators are 16 or older with a valid driver's license.
- Do not let people drive or ride after using alcohol or drugs.
- Do not allow operation on public roads (unless designated for off-highway vehicle access) -- collisions with cars and trucks can occur.
- Do not exceed seating capacity: [X] passenger[s].



1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
4. Graphics for seat belt, helmet, rollover, and age.
5. General preparation
6. Examples of responsible operation
7. Support proper attention/response
8. Responsible ownership/encourage intervention/reduce risk multipliers
9. References to additional safety information

## ▲ **WARNING**

### **Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death**

#### **Be Prepared**

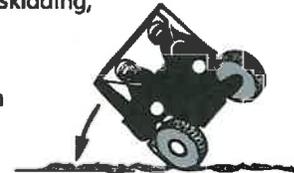
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[Locate and] Read [Owner's Manual]

**Follow All Instructions and Warnings**

[Reserved for References to Other Sources of Safety Information]

# Example Formats

## **⚠ WARNING**

### **Improper Use of Off-Highway Vehicles Can Cause Severe Injury or Death**

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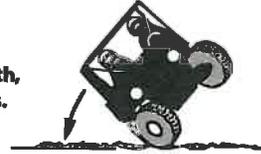
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**Rollovers have caused severe injuries and death, even on flat, open areas.**



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**[Locate and] Read [Owner's Manual]  
Follow All Instructions and Warnings  
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## ⚠ WARNING

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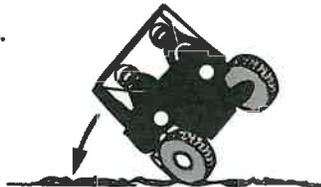
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# Example Formats

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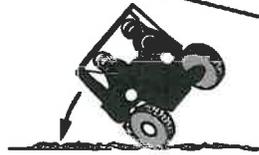
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#### **Require Proper Use of Your Vehicle**

Do your part to prevent injuries:

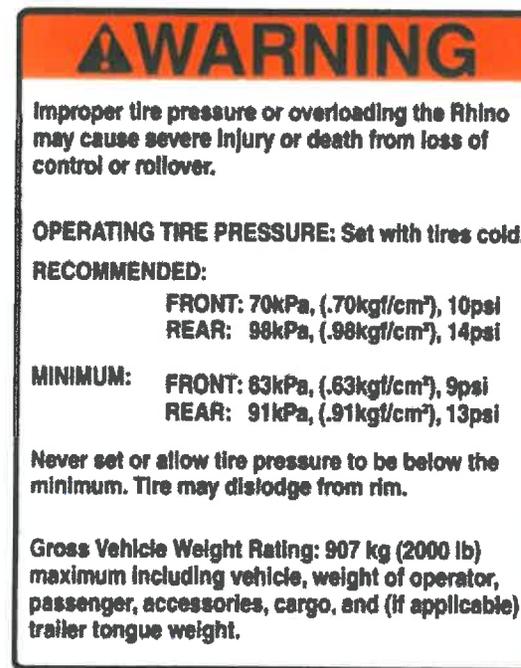
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- Do not exceed seating capacity: [x] passenger[s].

**[Locate and] Read [Owner's Manual] Follow All Instructions and Warnings [Reserved for References to Other Sources of Safety Information]**

# Additional Warnings

- Cargo Bed
- Tire Pressure
- Overloading

## Example Conforming Labels



# Education and Training



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## ROV DriverCourse consisting of:

- **ROV E-Course**
  - Over 2,000 enrolled since July
    - Up 84% since October
  - Member, Trade and Enthusiast Websites Driving Participation – 25 unique sites
- **ROV Hands-On course**
  - Initial range exercise concepts – **COMPLETED**
  - Continued range exercise development – January 2011
  - Pilot-testing – Spring 2011
  - Field-testing – Spring 2011
  - Complete course content – Summer 2011
  - Begin Instructor Certification/Roll-Out – August 2011



**ROHVA Proactively Addressing ROV Safety**

# Vehicle Class



## Definition of ROV

- **ANSI/ROHVA 1-2010 > 35 MPH**
- **Announced intent to broaden to > 30 MPH**
  - **In response to CPSC ANPR class identified as > 30 MPH**

**Goal is to Encompass Vehicles of Interest to CPSC**

# ROHVA's Comprehensive Safety Action Plan



RECREATIONAL OFF-HIGHWAY  
VEHICLE ASSOCIATION

## Vehicle Voluntary Standard

1. **Mandatory Static *and* Dynamic Stability Standards**
2. **Mandatory Occupant Retention Performance Standards**
3. **Mandatory Restraint Warning System**
4. **Vehicle Class to Meet CPSC Area of Interest**

## Occupant Behavior

1. **Mandatory Helmet and Seat Belt Use**
2. **Standardized Warning Labels**
3. **Free E-Course Training**
4. **Hands-On Training**

**Significant Progress in All Areas  
Prepared to Canvass Updated Standard**