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

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
belted test dummy where the torso of the dummy does not extend more than 5 inches beyond the vehicle width.

- Zone 3 – Arm/Hand area will require a barrier that withstands a 50 lbf outward force and have no opening greater than 3 inches or the ROV shall pass a 45 degree tilt of the vehicle with a seat belted test dummy where the arm/hand of the dummy does not extend more than 7 inches beyond the vehicle width.

- Zone 4 – Head area will require mandatory helmet use.

- Seat Belts – the standard will require a minimum 3-point restraint for all seats and mandatory restraint warning light that illuminates for at least 8 seconds.
- CPSC staff asked what tests, studies, or research were used to develop the design and performance requirements for each of the zones; and that the research be made available to staff.
- CPSC staff stated that it appears that ROHVA’s requirement for mandatory helmet use will address interior head impact but not crushing of the head by the vehicle. Staff asked if ROHVA has determined if a helmet can withstand crushing by a typical ROV. ROHVA replied that they did not know.
- CPSC staff asked how ROHVA intended to make helmet use mandatory. ROHVA indicated that all manufacturers will prominently recommend helmet use.

The following points were made regarding static and dynamic testing of ROVs:

- In response to CPSC staff’s comments on the canvass drafts of the voluntary standard, ROHVA added more rigorous tilt table requirements. The required lateral tilt angle for an ROV with 2 occupants was increased to a 30 degree angle (from 28 degrees).
- DRI reviewed the rollover resistance test (RRR) that they developed to evaluate ROV dynamic stability. The test is a constant steering wheel angle test where the steering wheel of the test vehicle is locked at a 25 ft radius circle and accelerated until 2-wheel lift occurs or 2-wheel spin/spiral-in occurs. The tests are conducted on asphalt.
- A vehicle passes the RRR if 0.6g of lateral acceleration is achieved without 2-wheel lift or the vehicle becomes speed limited. A vehicle fails the RRR if 2-wheel lift occurs below 0.6g of lateral acceleration. A vehicle must pass 8 of 10 runs (5 in clockwise and 5 in counterclockwise directions) for the vehicle to pass.
- DRI believes 0.6g is greater than the average off-highway tile/soil lateral force coefficient of off-highway surfaces.
- DRI presented test data of 6 vehicles that were tested to show that 2-wheel lift occurred for both oversteer and understeer vehicles. DRI maintains that oversteer/understeer is dependent on the test surface and that asphalt results do not equal off-highway results.
- CPSC staff asked how the 0.6g value was developed. DRI responded that it was based on measurements that were taken in the 1980s of 20 ATV riding areas. Staff asked if these riding areas were similar to terrain where actual ROV incidents have occurred, such as grassy fields. DRI responded that they would have to look at that.
- CPSC staff and DRI discussed rollover thresholds, tripped versus untripped rollovers, and the significance of understeer and oversteer characteristics of the vehicle. DRI did not agree with CPSC staff statements that oversteer is an undesirable characteristic due to lateral acceleration gain and vehicle slide that can
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.
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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

- No Seat Belt: 85%
- No Helmet: 83%
- Using Alcohol/Drugs: 30%
- #Riders>#Seats or Riders in Back: 29%
- Driver Under 16: 24%
- Excessive Speed: 18%
- Public/Paved Road Riding: 12%
- Doing Stunts: 9%

Percent of ROV Incidents

ROHVA Focus: Fact & Data Based Standards Development

* Heiden Analysis
## 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**

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

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
Zone 2 – Shoulder / Hip

Construction basis:
- Barrier shall cover points R & R₂
  - Must withstand 100-lbf outward force,
    OR

Performance basis:
- Tilt ROV with belted test dummy to 45°
  - No torso excursion > 5” beyond ROV width

Construction or Performance: Allows For Innovation
Occupant Retention System

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

Balances Retention with Need for Mobility

Not to Scale
Occupant Retention System

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
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
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
Static Stability

- **Tilt-Table (Roll)**
  - $24^\circ @\text{GVWR: +20\%} > \text{ANSI/ROHVA 1-2010}$
  - $30^\circ @\text{Curb Weight + 2 occupants: +7\%} > \text{ANSI/ROHVA 1-2010}$

- **Tilt-Table (Pitch)**
  - $28^\circ @\text{GVWR: +12\%} > \text{ANSI/ROHVA 1-2010}$

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

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

Driver Input
- Steering
- Power

Vehicle Design & Technologies

Vehicle Output
- Direction
- Speed

Encourages Continued Innovation
Dynamic Research, Inc.
Commissioned by ROHVA

John Zellner
Technical Director

John Lenkeit
Technical Director

Dynamic Research, Inc.
TOPICS

- Comparison of steer characteristics with roll resistance results
- Overview of dynamic ROV roll resistance test procedure
- Summary results
Dynamic Research, Inc.

COMPARISON OF STEER CHARACTERISTICS WITH ROLL RESISTANCE RESULTS

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

In Response to CPSC
APPREACH

- 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 Ay

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 Gradient (deg/g) vs. Limit Ay

- 2-Wheel Lift
- 2-Wheel Spin Spiral In
- 1-Wheel Spin/Lift

6 vehicles shown,
4 conditions / vehicle
multiple runs

Understeer / Oversteer:

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

TWL Occurs for Both Oversteer & Understeer
ADDITIONAL OBSERVATIONS

Oversteer / understeer:

- Is highly dependent on test surface
- Asphalt results ≠ 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

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

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, ≤ 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

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<tr>
<th>Vehicle</th>
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<th>Steer Angle</th>
<th>Left Mean Ay(g)</th>
<th>No.</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>Speed (mph)</th>
<th>Right Mean Ay(g)</th>
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<td>16.76</td>
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</table>

Average:

*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**
J. Paul Frantz, Ph.D., C.P.S.M., CPE
Senior Consultant/Co-Founder

Applied Safety and Ergonomics, Inc.
Commissioned by ROHVA

Applied Safety and Ergonomics, Inc.
ANSI/ROHVA 1-201X
Revision of Labeling Requirements

- Identification of topics to consider for uniform label(s) (hazard review)
- Review of existing language for selected topics
- Development of draft language and symbols for potential inclusion in ANSI/ROHVA-1
- Development of example labels
- Evaluation of example labels
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

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.

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

*39 Observations With Start of Turn Speed Over 12 MPH
Analysis of ROV Driver Control and Turning

Pre-Turn (MPH)  Start of Turn (MPH)  Maximum Turn (MPH)
9.0              8.4              7.7
"Slow"           "Slow"           "Slow"
"Gentle"         "Gentle"         "Gentle"
"Careful"        "Careful"        "Careful"

Novice Rider Study- Class 1

*Novice Rider Turns with 50-65% Steer at Maximum Turn
Analysis of ROV Driver Control and Turning

Pre-Turn (MPH)
- Novice Rider Study- Class 1: 9.0
- Novice Rider Study- Class 2: 10.3

Start of Turn (MPH)
- Novice Rider Study- Class 1: 8.4
- Novice Rider Study- Class 2: 9.9

Maximum Turn (MPH)
- Novice Rider Study- Class 1: 7.7
- Novice Rider Study- Class 2: 8.9

*Novice Rider Turns with 50-65% Steer at Maximum Turn
Analysis of ROV Driver Control and Turning

- **Pre-Turn (MPH):**
  - Novice Rider Study- Class 1: 9.0
  - Novice Rider Study- Class 2: 10.3
  - Engineering Institute Testing: 15.7

- **Start of Turn (MPH):**
  - Novice Rider Study- Class 1: 8.4
  - Novice Rider Study- Class 2: 9.9
  - Engineering Institute Testing: 15.9

- **Maximum Turn (MPH):**
  - Novice Rider Study- Class 1: 7.7
  - Novice Rider Study- Class 2: 8.9
  - Engineering Institute Testing: 15.4

*Novice Rider Turns with 50-65% Steer at Maximum Turn*
Examples
- ROV Warning Labels
- ROV Owner’s Manuals
- Vehicle Standards/Practices
- Vehicle Regulations
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

**WARNING**

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

Be Prepared

Drive Responsibly

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
1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
5. General preparation
1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
5. General preparation
6. Examples of responsible operation
1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
5. General preparation
6. Examples of responsible operation
7. Support proper attention/response
1. ANSI Z535.4 style
2. Vehicle class message
3. Heading/grouping
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
- 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
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 hillsing (riding across slopes).

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
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
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
**Example Formats**

**WARNING**

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

**WARNING**
Improper tire pressure or overloading the Rhino may cause severe injury or death from loss of control or rollover.

OPERATING TIRE PRESSURE: Set with tires cold.
RECOMMENDED:
FRONT: 70kPa, (.70kgf/cm²), 10psi
REAR: 90kPa, (.90kgf/cm²), 14psi
MINIMUM:
FRONT: 63kPa, (.63kgf/cm²), 9psi
REAR: 91kPa, (.91kgf/cm²), 13psi

Never set or allow tire pressure to be below the minimum. Tire may dislodge from rim.

Gross Vehicle Weight Rating: 907 kg (2000 lb) maximum including vehicle, weight of operator, passenger, accessories, cargo, and (if applicable) trailer tongue weight.

**WARNING**
Never carry passengers in cargo bed.
Education and Training

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
<table>
<thead>
<tr>
<th>Vehicle Voluntary Standard</th>
<th>Occupant Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mandatory Static and Dynamic Stability Standards</td>
<td>1. Mandatory Helmet and Seat Belt Use</td>
</tr>
</tbody>
</table>

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