

# **LOG OF MEETING**

## **DIRECTORATE FOR ENGINEERING SCIENCES**

SUBJECT: Voluntary Standards Meeting to Discuss Off-Highway Vehicle (OHV) Fires and Debris Penetration

DATE OF MEETING: September 19, 2018

PLACE OF MEETING: Grand Hyatt Hotel at Dallas-Fort Worth Airport, Texas

LOG ENTRY SOURCE: Han Lim, Engineering Sciences, Division of Mechanical and Combustion Engineering (ESMC)

### SUMMARY OF MEETING:

On September 19, 2018, CPSC staff participated in a voluntary standards meeting with members of the Specialty Vehicle Institute of America (SVIA), the Outdoor Power Equipment Institute (OPEI), and the Recreational Off-Highway Vehicle Association (ROHVA).

CPSC staff presented an overview of recall data associated with OHV fire hazards and debris penetration. CPSC staff recommended the SVIA, OPEI, and ROHVA members form task groups to examine potential improvements to the SVIA-1 standard (for all terrain vehicles), OPEI B71.9 standard (for utility vehicles and recreational off-highway vehicles), and the ROHVA-1 standard (for recreational off-highway vehicles) to mitigate fire/burn and debris penetration risks.

SVIA, OPEI, and ROHVA staff requested CPSC staff to supply redacted in depth investigations (IDI's). CPSC staff agreed to supply the redacted IDI's for further study.

*A copy of the CPSC staff presentation is attached to this meeting log.*

### ATTENDEE LIST:

#### CPSC Staff:

Han Lim....ESMC  
Caroleene Paul....ESMC  
Mark Kumagai....Division Director for ESMC

#### Non-CPSC attendees:

Erik Pritchard....SVIA / ROHVA  
Alex Berger....SVIA / ROHVA  
Tom Yager....SVIA / ROHVA

Michael Wiegard....ESCM  
Tom Johnson....Kawasaki  
Tyler Furman....Kawasaki  
Tony DiViesti....Safety Research Strategies  
Marie Claude Simard....Bombardier Recreational Products (BRP)  
Bruce Shanahan....Kubota Tractor  
Ken Bush....Suzuki Motor of America, Inc.  
Mike Mitchell....Polaris Industries, Inc.  
Mike Gentine.... Polaris Industries, Inc.  
Greg Knott....Outdoor Power Equipment Institute (OPEI)  
Brad Franklin....Yamaha Motor Corporation  
Bob Loehr....John Deere  
Jason Britt....Textron Specialized Vehicles  
Matthew Cairns.... Textron Specialized Vehicles  
Raymond Quon....American Honda  
Tom Kim....American Honda

Han Lim

Mechanical Engineer

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Directorate for Engineering Sciences (ESMC)

September 19, 2018



# Voluntary Standards Meeting to Discuss Off-Highway Vehicle Fires and Debris Penetration

# Meeting Agenda

- Off-Road Vehicle Fires
- Debris Penetration
- Recommendations
- Questions and Answers

# Off-Road Vehicle Fires

# Overview of Recall Data

- Off-highway vehicle fires/burns: hazard not addressed in voluntary standards
- Examples: Debris intrusion, fuel tank structural integrity, flammable body panels, etc.

# List of Off-Highway Vehicle (OHV) Voluntary Standards (2018):

- ATVs: ANSI/SVIA 1-2017 Four Wheel All-Terrain Vehicles – Equipment, Configuration, and Performance Requirements (mandatory CPSC standard)
- ROVs: ANSI/ROHVA 1-2016 Recreational Off-Highway Vehicles
- ROVs and UTVs: ANSI/OPEI B71.9-2016 – American National Standard for Multipurpose Off-Highway Utility Vehicles

# Fuel Tank Leak Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ATV	05-557	16,200	0	3/24/2005	Fuel tank leak
ATV	07-560	930	4 (0)	6/20/2007	Loose fuel valve within fuel tank
ROV	08-521	330	4 (0)	12/6/2007	Fuel tank leak
UTV	08-606	2,500	7 (0)	9/16/2008	Gap in the seam at the base of the fuel tank filler neck
ATV	11-727	29,000	19 (0)	3/10/2011	Fuel tank improperly manufactured
ATV	15-701	540	0	10/7/2014	Fuel cap did not properly vent



# Fuel Tank Leak Recalls

## (continued)

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ROV	15-743	4,300	0	7/23/2015	Loose fuel tank retainer ring
ATV	18-750	13,300	6 (0)	6/29/2018	Fuel can spray from the fuel tank when opening the gas cap
<b><i>Totals</i></b>	<b><i>8 recalls</i></b>	<b><i>67,100</i></b>	<b><i>40 (0)</i></b>		

# Fuel/Oil Hose Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ATV	04-585	12,170	31 (0)	9/27/2004	Fuel hose rubbing against vehicle chassis
UTV	12-727	3,900	0	3/15/2012	Fuel tube scraping against air cleaner housing
UTV	13-717	4,650	3 (0)	1/10/2013	Fuel hose can separate
UTV	14-753	5,600	61 (1)	9/11/2014	Oil leak from oil cooler lines
ROV	16-702	53,000	31 (2)	10/6/2015	Fuel tank vent line
UTV	16-763	240	0	7/28/2016	Fuel hose leaks or hose can separate when pressurized
ATV	17-190	25,600	34 (4)	7/19/2017	Fuel leaks from vent hose into headlight pod
ROV	18-708	560	1(1)	12/21/2017	Fuel leak from incorrectly secured return fuel hose
<b><i>Totals</i></b>	<b><i>8 recalls</i></b>	<b><i>105,720</i></b>	<b><i>161 (8)</i></b>		

# Debris Related Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
UTV	12-713	1,876	3 (3)	1/26/2012	Debris/grass in the exhaust can ignite
ROV	13-103	25,000	18 (18)	1/29/2013	Debris/grass in the exhaust can ignite
ROV	15-706	15,400	10 (10)	10/16/2014	Vegetation/debris caught in exhaust can ignite
UTV	16-710	11,500	7 (7)	12/8/2015	Debris in Exhaust can ignite
<b><i>Totals</i></b>	<b><i>4 recalls</i></b>	<b><i>53,776</i></b>	<b><i>38 (38)</i></b>		

# Electrical Related Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ATV	08-193	95,000	392 (20)	2/14/2008	Overheating ECM
ATV	08-580	700	6 (2)	6/4/2008	Overheating ECM
UTV	08-583	700	5 (0)	6/11/2008	Excessive heat melts wiring harness
ROV	09-762	3,800	46 (22)	8/4/2009	Electrical short – tail light wiring harness
ROV	18-037	300	49 (5)	11/16/2017	Winch solenoid located under the operator seat can overheat
<b><i>Totals</i></b>	<b><i>5 recalls</i></b>	<b><i>100,500</i></b>	<b><i>498 (49)</i></b>		

# Engine/Exhaust Related Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ATV	09-755	4,700	6 (3)	7/22/2009	Valve assembly can fail in freezing temperatures, oil leaks into exhaust
UTV	13-725	4,700	4 (4)	2/14/2013	Oil Filter leak
UTV	14-724	2,300	0	3/18/2014	Fuel fitting at throttle body
UTV	15-744	2,700	0	7/28/2015	Fuel fitting at throttle body
UTV	16-257	10,770	19 (19)	9/1/2016	Engine overheat, loose turbocharger oil drain tube
ROV	16-713	2,230	4 (2)	12/10/2015	Loose turbocharger oil drain tube
ATV	17-061	9,900	35 (0)	12/29/2016	Air intake duct contacting fuel rail

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# Engine/Exhaust Related Recalls

## (continued)

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ROV	18-133	107,000	30 (3)	4/2/2018	Exhaust muffler cracking can allow hot gases to melt nearby components or cause fires
ROV	18-742	65,000	22 (3)	5/15/2018	Exhaust muffler overheat can cause the plastic heat shield to melt or catch fire
UTV	18-757	2,700	7 (0)	8/8/2018	Exhaust header pipe can crack, posing fire and burn hazards
UTV	18-758	2,100	7 (0)	8/8/2018	Exhaust header pipe can crack, posing fire and burn hazards
<b><i>Totals</i></b>	<b><i>11 recalls</i></b>	<b><i>214,100</i></b>	<b><i>134 (34)</i></b>		

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# Fuel Filter Related Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
UTV	13-706	4,340	0	11/15/2012	Fuel filter leak
ATV	16-701	240	8 (0)	10/7/2015	Fuel filter leak
<b><i>Totals</i></b>	<b><i>2 recalls</i></b>	<b><i>4,580</i></b>	<b><i>8 (0)</i></b>		

# Overheating Plastic Panel Recalls

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ROV	13-740	4,500	1 (0)	6/19/2013	Firewall behind the driver / passenger seats can overheat and melt
ROV	16-264	42,500	36 (36)	9/15/2016	Detached heat shield above exhaust header
ROV	16-755	43,000	7 (7)	6/28/2016	Vehicle overheat (no specifics)
ROV	17-132	51,000	13 (5)	4/13/2017	Detached heat shield above exhaust header
ROV	18-017	14,100	444 (5)	10/27/2017	Exhaust can melt the plastic panels behind the operator and passenger seat
<b>Totals</b>	<b>5 recalls</b>	<b>155,100</b>	<b>501 (53)</b>		



# Recalls due to Multiple Fire/Heat Sources

Vehicle Type	Recall #	# of Affected Vehicles	# of Incidents (fires)	Recall Date	Specific Reason
ROV	16-146	133,000	160 (160)	4/19/2016	Multiple Components
ROV	17-102	13,500	17 (15)	3/2/2017	Engine misfire, brake master cylinder
ATV	17-112	19,200	793 (47)	3/21/2017	Melting body panels, exhaust pipe spring failure
ROV	17-195	16,800	130 (4)	7/25/2017	Fuel tank leak and wiring harness short
<b>Totals</b>	<b>4 recalls</b>	<b>182,500</b>	<b>1100 (226)</b>		

# Fire Preventive Requirements In Those Standards Today

- Spark Arrestor requirement referencing US Forest Service standard USDA-FS 5100-1.
- ANSI/OPEI B71.9-2016 requirement: “All fuel system components shall be located, routed, and contained in such a manner as to provide clearance to heat-generating components and to avoid damage from obstacles or projections that may be encountered during normal operation.”
- Above requirements do not address some sources of potential fire hazards illustrated in recall data.

# Issues Identified from the Recalls

- Fuel Tank System Structural Integrity
- Various flammable fluid carrying hoses that leak or separate: fuel hoses, vent hoses, oil cooler line hoses
- Structural integrity of fuel filters
- Electrical: Overheating Engine Control Modules (ECM's), Overheating Voltage Regulators, Wiring Harness shorts
- Flammable Plastic Body Panels
- Debris Intrusion into Exhaust Header Pipe area

# Staff Recommendations

- Form Task Groups by agreed upon topics to study recall data, IDI scenarios, and investigate potential improvements to standards
- Examine fuel tank test procedures for vehicles of similar class to determine applicability to OHV's:
  - ANSI/International Light Transportation Vehicle Association (“ILTVA”) Z135-2012 – Personal Transportation Vehicles – Safety and Performance Specifications
  - ANSI/ILTVA Z130.1-2012 – Golf Cars – Safety and Performance Specifications
  - Other standards as suggested by working groups

# Recommended Additions to Standards:

- Surface Temperature Limits
  - Examine standards for contact burn mitigation to determine applicability to OHV's:
    - ASTM C1055 – Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries
    - ISO 13732-1 Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot Surfaces to determine applicability to off-highway vehicles
- Structural Integrity of Fuel System components: fuel tanks, fuel hoses, fuel pumps, vent hoses, fuel filters, grommets, fuel rollover containment, etc.

# Recommended Additions to Standards (continued):

- Spacing Requirements, physical barriers, and/or exhaust heat management to mitigate ignition of combustible materials (debris, plastic components, etc.) near exhaust components
- Electrical: Fire resistance and self-extinguishing requirements of electronic components and surrounding housings when tested under overload conditions Requirements to minimize wiring harness shorts
- Engine: Requirement to minimize fires due to leaking flammable fluids such as gasoline, engine oil, etc.

# Off-Road Vehicle Debris Penetration

# Debris Penetration Recalls

- Recall 16-714\* (expansion of previous recall, 14-741) involved 30,000 affected vehicles and “628 incident reports of debris cracking or breaking through floor boards of vehicles, including eight reports of injuries to riders' lower extremities.”
- ROHVA / SVIA / OPEI standards do not have any requirements to address debris penetration
- Similar to fire preventive requirements, staff recommends voluntary standards groups form task groups to study debris penetration issue to develop debris penetration preventive requirements.

\*Recall14-741 was launched July 30, 2014

Recall 16-714 was launched December 15, 2015



# Questions and Answers