

CODE4 Fire & Rescue

YOUR HURST "JAWS OF LIFE" DEALER

A Magazine for the Canadian Rescuer
Proudly Serving Those Who Serve Others

www.code4.com
Winter 2010

presents **EXTRICATION**
Quarterly MAGAZINE

HAND TOOLS:
Equally Important &
Never More Popular

Air Bag Testing
Testing by Code4

Body Shock

McNabb-Braeside FD
with one of their Hurst HP
Combo Plus Hand Tools

PRODUCT REVIEW: HURST Hand Tools

HURST HP Combi Plus Manual Combination Tool



Considered by many to be the best manual Spreader/Cutter **Ever**



TOOLS CUTTING AN "A" POST



TOOL SPREADER A NADER BOLT



HURST Jack Rabbit Tool

For Building/House
Extrication
& Automobile Extrication

A **MUST** for every fire department

PRODUCT REVIEW: HURST Hand Tools

Hurst Pedal Cutter

- Our best selling specialty tool



Hurst LKE 55 Combination Tool:

Electric power - no gas, hoses or set-up time



SERVICE REVIEW: Air Bag Testing

Vetter Air Bag Testing:



Factory test your Vetter Air Bags - exclusively from Code 4

Your Extrication Professionals



7th Year

All prior copies, since 2004 can be viewed at www.code4.com

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CODE4 Learning Channel



Thank you to...

Pete Methner: Technical Advisor
Angela Simon: Graphic Designer

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50 Questions: How well do you rate your knowledge as an **EXTRICATION TRAINER?**

Training Officers are very much like General Practitioners or Family Physicians. They are required to have a through understanding of all aspects of Fire and Rescue. In this issue, we will ask a series of questions to provoke the thought process and test your general Extrication Knowledge.

- 1) Power Units can have 1, 2, 3 or more pumps within the Power Unit assembly. How many stages are generated by each pump?
- 2) From a volumetric point of view, relate flow to each stage.
- 3) From a pressure point of view, relate pressure to each stage.
- 4) What defines High Pressure Tools as being High Pressure?
- 5) What defines Low Pressure Tools as being Low Pressure?
- 6) Are High Pressure Tools more Powerful than Low Pressure Tools?
- 7) Describe 5 Elements of Scene Stabilization.
- 8) What parameters determine a "Hot Zone?"
- 9) In conducting proximity searches during a Scene Stabilization search, should we conduct an inner search or outer search first, or does it really matter?
- 10) Disconnecting the battery is one way to de-energize a non-hybrid vehicle. What is a second way?
- 11) Is it possible (without having a fault, short, or defect in workmanship) to have both frontal air bags deploy without a collision occurring?
- 12) Why do we disconnect a battery other than possible sparking?
- 13) What concerns do we have, other than those of the patient(s) when cutting a roof off?
- 14) How are roof curtains, seat mounted air bags and door mounted air bags activated?
- 15) What procedure(s) prevent their activation?
- 16) What is the most common location for Air Bag Inflation Cylinders for Roof Curtains?
- 17) Second Most Common Location?
- 18) Name 2 Other Possible Locations?
- 19) How do we readily identify their locations?
- 20) Are there Inflation Air Bag Cylinders in Seats?
- 21) Can a vehicle have only laminated glass in all windows?
- 22) In making access into a vehicle, which unbroken glass to we typically break and remove first?
- 23) What are the best devices for breaking tempered glass?
- 24) What are the worst devices for breaking tempered glass?
- 25) What are the best devices for removing laminated glass?
- 26) What are the recognized methods of creating a purchase point?
- 27) What technique works 100% of the time?
- 28) What are the 3 Typical Types of Displacement evolutions we employ when extricating trapped patients?
- 29) Why is roof peeling less beneficial than full roof removal?
- 30) When is roof peeling more beneficial than full roof removal?
- 31) What are 2 Tools that can be used to displace a dash?
- 32) What Tool is the most effective for Dash Displacements?

TRIPLE YOUR CAPABILITIES:

HURST'S TRIPLE PUMP TRIMO POWER UNIT



THE #1 POWER UNIT IN CANADA..... BY FAR! Gas or 220V Electric

Q: WHY IS THIS SUCH A POPULAR POWER UNIT? –

A: MULTI-TASKING 3 Pumps means operating 3 Tools with No Loss of Speed or Power, enabling you to Hook up a Spreader, Cutter and a Ram, and away you go!

133 Recent Triple Pump

Mississauga FD; Alnwick-Haldimand Township (2); Haldimand County; Hillsborough FD; St. Catharines FD; Lambton Shores FD; Seneca College; North Middlesex FD; Pickering FD; North Rustico FD; Mahone Bay FD; Town of Petawaw FD; Brockville FD; Vaughan FD; Deep River FD; Vaughan FD; Collingwood FD; Norfolk County FD; Hamilton FD (5); Brampton FD; Innisfil FD; Inverness FD; Port Hawkesbury FD; Whitby FD; Bear River; Oliver-Paiipoonge; Grand Valley; Glencoe; Shelburne (2); Chippewas-of-Thames; Clarington; Bruce Nuclear; US Steel; Algonquin Highlands; Richmond Hill; Niagara Falls; CFB Gagetown; Quinte West; Walkerton; Grand Bend; Orillia; North Middlesex; Eel Brook; Advocate & District; Summerville & District; Weymouth FD; Prince Edward County(2); Shelburne, ON; Chatham-Kent; Windsor, NS; Milton; Fredericton; Clarington (3); O'Leary; Onslow-Belmont; St. Andrews-By-The-Sea; Minto Township (2); New Glasgow, St. Bernard, Norfolk County, Tay Township, Markstay-Warren, Kingston, NS; Sydney, NS; Blythe, ON; Chatham-Kent, ON (4); Milton (2); Wellesley (2); Rideau Lakes; Woodstock, NB; Hartland; Barrie (3); Saint John; Echo Bay; Dundalk; St. Catherines; Guelph/Eramosa; Kawartha Lakes; Moncton; Niagara-On-The-Lake (2); Belleville (3); Hogansburg-Akwasasne; Huntsville; Burks Falls; Cornwall; Vaughan (3); Windsor; Grand Bay-Westfield; McDougall; Baltimore; West-Grey; Prescott; Strathroy; Welland; Chester Basin; Essex; Orillia; West Lincoln; Hamilton (3); Orangeville; Sudbury; Richmond Hill; Long Sault; Central York; Barneys River; Elizabethtown-Kitley and more....

- 33) Why is this tool more effective?
- 34) A Cutter with 236,000 pounds of Cutting Force is always better than a Cutter possessing only 85,000 pounds of Cutting Force?
- 35) Apart from the actual Cutting Force, what variables determine the likelihood for completing a successful cut?
- 36) True or False: Spreaders open linearly?
- 37) True or False: Rams open linearly?
- 38) True or False: Cutters can lose as much as half their mechanical advantage (or more) when cutting at the tips of the blades versus the inner notch.
- 39) True or False: Once a cutter stops moving and the cut stops, full pressure on the power unit is reached?
- 40) True or False: When performing a dash displacement, the roof must be either peeled or removed?
- 41) Performing a Dual Ram Push (2 rams pushing simultaneously – one on each "A" Post) is more effective than a single Ram Push on one side?
- 42) When Spreading a Door off, regardless of being hinge side or nader bolt side, the effectiveness of the spread is enhanced if we angle the tips:
 - a) Upwards;
 - b) Downwards;
 - c) Parallel to the ground?
- 43) What is the advantage of breaking the Valve Stems during Vehicle Stabilization?
- 44) You arrive on scene, and you are facing an MVA involving a Hybrid vehicle. How can we be sure that High Voltage Power is contained at the High Voltage Battery?
- 45) What is referred to as the "Sleep Mode" of a Hybrid Vehicle?
- 46) Why do we perform a Total Side Removal (both doors and "B" Post are removed)?
- 47) How can a Total Side Removal hurt us in subsequent evolutions?
- 48) What is referred to as the Coefficient of Elasticity in Hydraulic Hose Lines?
- 49) How does the Coefficient of Elasticity directly affect performance of the Tools?
- 50) In performing a Dash Displacement what are the critical "relief cuts" that we try to make?

AJAX 911-RK Super Duty Kit



Answers are on our website: See 50 Questions/50 Answers



CODE4: Rece

CODE 4: RECENT HURST "JAWS OF LIFE" DELIVERIES:

Blue Mountains FD, Blue Mountains, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Dual Pump Simo Power Unit; 1 JL-30C Ram; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Brook Alvinston FD, Inwood, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Center Hastings FD, Center Hastings, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Township of Hamilton FD, Bewdley, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

St. Catharines FD, St. Catharines, Ontario has added [1 HURST LOW PRESSURE TRIPLE PUMP Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Triple Pump Trimo Power Unit; 1 Hurst MOC II Cutter; 3 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Hamilton Airport, Hamilton, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Dual Pump Simo Power Unit; 1 Hurst MOC II Cutter; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Riverside-Saint Albert FD, Riverside Saint-Albert, NB, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Saint-Jacques FD, Saint-Jacques, NB, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Dual Pump Simo Power Unit; 1 Hurst MOC II Cutter; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Hillsborough FD, Hillsborough, NB, has added [1 HURST LOW PRESSURE TRIPLE PUMP Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Triple Pump Trimo Power Unit; 1 Hurst MOC II Cutter; 3 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Salmon River FD, Salmon River, NS, has added [1 HURST LOW PRESSURE TRIPLE PUMP Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst Dual Pump Simo Power Unit; 1 Hurst MOC II Cutter; 1 – T59 Ram; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Whitestone FD, Whitestone, Ontario, has added [1 HURST LOW PRESSURE X-Tractor C Combination Tool System](#), c/w 1 Hurst X-Tractor C Combination Tool c/w Selector Valve Power Unit; 2 Hoses - **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

Saint John FD, Saint John, NB, has added [1 HURST STREAMLINE HIGH PRESSURE SYSTEM](#), c/w 1 Hurst SP 310 28.5" Spreader; 1 Hurst S 310 Cutter; 1 Hurst SIMO Dual Pump Power Unit and 2 hoses – **ALL TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY**

CODE4: Recent Deliveries CODE4: Recent Deliveries CODE4: Recen

ent Deliveries



Milton FD, Milton, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; ; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 1 JL-20C Ram; 1 JL-30C Ram; 1 JL-60C Ram; 2 Hoses - [All TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY](#)

Pickering OPG - Nuclear FD, Pickering, Ontario, has added [1 HURST STREAMLINE HIGH PRESSURE SYSTEM](#), c/w 1 Hurst SC 350 Combination Tool; 1 Hurst SELECTOR VALVE Power Unit and 1 hoses – [All TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY](#)

Woolwich FD, Woolwich, Ontario, has added [1 HURST LOW PRESSURE Defender System](#), c/w 1 Hurst Defender Spreader; 1 Hurst MOC II Cutter; 1 Hurst Dual Pump Simo Power Unit; 2 Hoses - [All TOOLS WITH STREAMLINE SINGLE COUPLING TECHNOLOGY](#)

CODE 4: RECENT HURST /VETTER AIR BAG DELIVERIES:

Cambridge FD (2 Sets), Cambridge, Ontario, has added [2 HURST/VETTER HIGH PRESSURE AIR BAG SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

Manitouwadge FD, Manitouwadge, Ontario, has added [1 HURST/VETTER HIGH PRESSURE AIR BAG SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

Hillsborough FD, Hillsborough, NB, has added [1 HURST/VETTER HIGH PRESSURE AIR BAG SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

Haldimand County FD, Inman Road, Ontario, has added [1 HURST/VETTER HIGH PRESSURE AIR BAG](#)

[SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

Milton FD, Milton, Ontario, has added [1 HURST/VETTER HIGH PRESSURE AIR BAG SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

Pickering OPG - Nuclear FD, Pickering, Ontario, has added [1 HURST/VETTER HIGH PRESSURE AIR BAG SYSTEM](#) c/w, 21 Ton 34 Ton High Pressure Air Bag, Command Console & Safety Hoses.

CODE 4: RECENT HURST SPECIALTY TOOL DELIVERIES:

Lanark Highlands FD, Lanark Highlands, Ontario, recently added a [1 HURST HP Combo-Plus Manual Combination Tool](#)

Cambridge FD, Cambridge, Ontario, recently added a [1 HURST HP Combo-Plus Manual Combination Tool](#)

Pickering OPG - Nuclear FD, Pickering, Ontario, has added [1 HURST Pedal Cutter](#)

Pickering OPG - Nuclear FD, Pickering, Ontario, has added [1 HURST Jack Rabbit Tool](#)

Rideau Lakes Township FD, Elgin, Ontario, has added [1 HURST S120 High Pressure Power Unit Pedal Cutter](#)

Summerville FD, Summerville, NS, has added [1 HURST S120 High Pressure Power Unit Pedal Cutter](#)

Pickering FD, Pickering, Ontario has added [1 HURST S120 High Pressure Power Unit Pedal Cutter](#)



HEAD-ON COLLISION

with a challenging extrication

Lunenburg Fire Department Lunenburg, Lunenburg Nova Scotia

On July 11, 2009 Lunenburg & District Firefighters, Emergency Health Services, Ground Ambulance, Lifeflight and RCMP were dispatched to a 2 vehicle MVC with entrapment at the Highway 332/Blue Rocks Rd. Intersection.

Firefighters responded with a Pumper, Heavy Rescue and Light Rescue. Upon arrival, firefighters encountered an SUV, upright on the highway with major front end/passenger side damage. In addition, a late model sedan was in the ditch with major front end damage. A 360 survey

revealed one patient injured in the SUV, and four patients in the sedan. The driver side of the sedan was buried into the mud up over rocker panel. This had all the ingredients for a difficult extrication. On the plus side, the tight-packed mud did aid in stabilization.

Patients were triaged by EHS paramedics, and the patient in the sedan's rear passenger side was rapidly extricated first. That patient was declared deceased by paramedics at scene.

Firefighters working in concert with paramedics began to extricate patients. The passenger-side front patient was quickly extricated onto a long board without difficulty



and was transported by ground to Fisherman's Memorial Hospital in Lunenburg, and later air lifted to Halifax. The remaining patients, both on the driver's side, remained trapped. Utilizing the department's Hurst X-Tractor II Cutter and Hurst Maverick Combination tools, the roof was flapped towards the driver's side, allowing the paramedics access to patients. Posts A, B, and C were cut on the passenger side, and post

A and C on the driver's, to allow a hinge effect on the B post. The rear patient was extricated first, and transported by Lifelight to the QE II Health Sciences Centre in Halifax. The driver was then extricated and was transported to South Shore Regional Hospital in Bridgewater. Congratulations to all responders in a very challenging, but successful extrication!

Hurst Tools used in this Extrication



**Selector Valve
Power Unit**



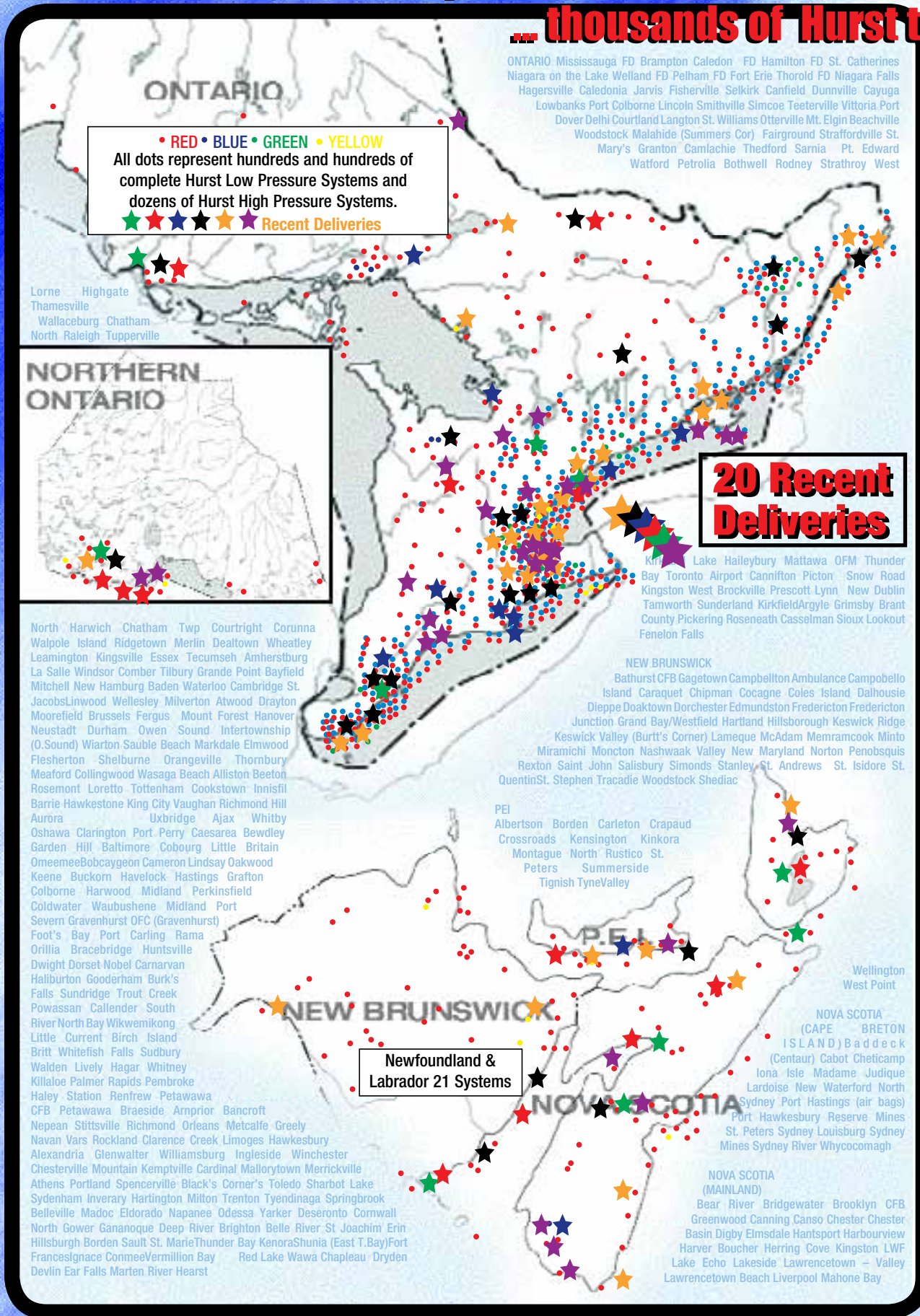
**Maverick
Combination Tool**



**X-Tractor II
Cutter**

CODE4: A thousand Hurst Systems...

... thousands of Hurst tools.



east coast profile

Barney's River Fire & Rescue

Barney's River, Nova Scotia

Fire Chief: Joe MacDonald
Deputy Chief: Adam Williams
Captain: Barrie Mac Donald
Captain: Mark Bannerman

Barney's River is located in North Eastern Nova Scotia on the border of Pictou County and Antigonish County. Our Red Fire Hall is one the most recognizable fire halls in Atlantic Canada located on a turn east of Exit 29 in Barneys River. At present we have 15 volunteers.

Barney's River covers 13 communities in an area of 205 square kilometers. Within our area we have 11km of the most dangerous and notorious portions of the Trans-Canada Highway in the province of Nova Scotia through Marshy Hope. This portion of highway has been the scene of many MVAs over the years. In addition, the railway runs through our jurisdiction.

In 2006 the department recognized the need for hydraulic rescue equipment. After extensive comparison testing we purchased a Hurst Jaws of Life High Pressure System with Triple Pump to enable us to run our 3 Tools all at the same time.

Due to the fact that we are a rural community, many of our fire personnel work outside our coverage area. Given that, we have a unique working relationship with our neighboring department, Merigomish. Each department is dispatched to each other's calls by our new repeater installed in 2009. This provides our communities with a base level of coverage through the daytime hours. Barney's River is also part of the Pictou County Association Mutual Aid agreement.



Our average calls per year range from 35 to 50 with over half the calls being motor vehicle accidents.

Barney's River attended the first Atlantic Code 4 JOLT ("Jaws of Life" Tournament) in 2007. For the past two years our team has won First Prize in the Maritime JOLT. .

Our Hurst Jaws of Life High Pressure System consists of:

- 1 Hurst Trimo High Pressure Triple Pump Power Unit
- 1 Hurst 28 Inch Universal Spreader
- 1 Hurst 6 Inch Cutter
- 1 Hurst T-59 Telescopic Ram
- 1 HP Combo Plus (Manual combination spreader and cutter)
- 1 Hurst/Vetter - 55 ton two bag High Pressure Air Bag System.

Our fleet of trucks consists of:

- 11050 gpm Pumper,
 - 11500 gal Tanker
 - 1 New rescue unit put into service this past October.
- We purchased our Hurst Tools from the Great People at Code 4 and will continue to do so.

#1 Stabilization System

85 DELIVERIES



Upgrade Your Strut Truck Kit with an OSHA Approved Tripod Upgrade Kit



Rescue 42
Lightweight Composite Stabilization Struts

Exclusively from

CODE4
Fire & Rescue



Hybrid Vehicles

When the first hybrid vehicle hit the streets in 1999 there was a lot of skepticism amongst car enthusiasts as well as rescuers in the fire service. Toyota has released its 3rd generation Prius Hybrid with great success of the past two generations, as well as generated a large amount of confidence as being one of the safest vehicles on the road today. Under the hood, yet another innovative paradox: more power, less fuel. With two motive forces, rescuers are finally grasping a better understanding of how they work and the benefit of both forces. This Hybrid Synergy Drive System delivers 134 hp of hybrid power and is supported by a 1.8 litre 4 cylinder gas engine. It continues to use the sealed Nickel-Metal Hydride HV battery as it did in the previous generations of Prius.



From the outside of the vehicle the Prius is well marked as it has been in the past. Being only sold as a Hybrid the guess work has been eliminated truly by design first, then its identification markings that are clearly marked on the side and rear of the car. The only other car that was released as a Hybrid was the Honda Insight, and in the eyes of many... it's a true knock off of the Prius. This 3rd Generation Prius has Hybrid Markings clearly placed on both front fenders. On the rear of the tailgate, you will find the Prius Logo on the driver side and the Hybrid Logo on the passenger side of the car.



As we look to the interior of the car, we should still direct our attention to the center location of the dash at the base of the windshield. While checking for power, you will notice the green instrumentation display as well as the word "Ready" in the bottom left hand corner. Here you will also find the status of the battery charging or discharging. You will also see the three "mode" indicators. These include "EV" Electric, "ECO" Economy, and

"PWR" Power mode. Each of these modes can be selected while driving and the car will respond accordingly.

These three mode buttons are also located to the right of the stick shift on the centre console under the Climate Control System and above the Hazard Button.

A Push Button Start, Smart Key System will power up the vehicle from within a close proximity. There is no "key" slot on the dash or steering column. The Fob should be kept at least 16 feet from the vehicle to prevent accidental starting of the vehicle. We must isolate the power from inside the vehicle when possible by pushing the power button to shut the vehicle down if the READY light is illuminated. If unable to place the vehicle in PARK, you still have other options under the hood that will assist you in isolating power to the car. On the driver side behind the head lamp you will find a large black fuse box. Inside you will find the IGCT 30 amp Green Fuse and the AM2 fuse, 7.2 A Orange in color to disable the system from under the hood.

The Hybrid system under the hood hasn't changed much with the Hybrid system being on the driver side of the car and the gasoline engine on the passenger side of the car. The HV cables are highly visible on the back of the HV system and run approximately 18 to 20 inches inward from the driver side of the vehicle. The fuse box and circuit box are all under the same cover.

Locating the high voltage 201.6V battery and 12V low voltage are both found in the rear hatch and underneath a plastic tray and floor panel. The 12V battery can be found in the rear wheel well on the passenger side. The HV battery is located in the same location as the previous generations although the HV disconnect is located on the passenger side of the battery.

Unique to this vehicle is a solar panel that is part of the roof make up and is located between the "B" and "C" pillars. The cables run down through the C pillar and it is used to power and run the blower fan within the air-conditioning system. By shutting down the vehicle itself, doesn't shut down the power from the solar panel roof. Electrical current will only flow if the blower fan is turned on. This solar panel consists of 36 poly crystalline silicon solar cells connected in series and generates a maximum of 27V with a maximum current of 3.6 amps, depending on the outside temperature and sun intensity. It's also important to note

the power will not back feed into the 12V system.



The interior of the Prius boasts a full airbag safety system, with both driver and passenger Dual Stage front airbags, Front Seat mounted Side Airbags, front and Rear Head inflatable curtains and a driver side Knee airbag, along with an energy absorbing collapsible steering column.

With all Hybrid vehicles rescuers have always had a genuine interest in these vehicles. Take the time and visit your local dealer and ask questions, they will be more than happy to assist you.

Stay Safe

petemethner

Pete Methner is an Acting Captain with the City of Niagara Falls Fire & Emergency Services. Pete is Director of Education and Head Judge for J.O.L.T. (Code4 Fire & Rescue's Jaws of Life Tournament). Pete is a past Education Chair, I.A.F.C. (International Association of Fire Chiefs) and a past Education Chair of TERC (Transportation Emergency Rescue Committee) Canada and President of ON SCENE Rescue Training. Niagara Falls Fire Department has numerous Hurst LOW PRESSURE "Jaws of Life" systems. Pete is also a freelance contributor to numerous magazines including Firefighting in Canada, JEMS, and Fire/Rescue. Pete can be reached at autoexed@cogeco.ca

Body Shock

First off, I would like to thank those that have been sending me pictures and descriptions of their incidents in which they have applied both their extrication and their medical skills. Keep the stories and pictures coming.

I would like to continue discussing patient presentation that we may encounter as the result of an MVC or trauma in general. In this issue, let's chat about shock.

Shock...hmmm, that is a fairly broad term isn't it? The work "shock" is used to describe a condition that can be caused by very specific events. Shock has been defined using various methods, but to simplify things, we can define shock as being the lack of perfusion of oxygenated blood to the body's tissues. If we dive deeper into the medical texts, there are five recognized types of shock, Cardiogenic, Hypovolemic, Neurogenic, Septic, and Anaphylactic. Another type that has been used is psychogenic shock which is used to describe shock-like signs and symptoms caused by an emotional or visually disturbing event.

Before we start trying to guess is it this type or that type, a basic understanding of the body's "hydraulic" system is helpful. I like to refer to the components of the circulatory system as being a pumping evolution. In order to deliver water at a fire, a pump is needed (the heart,) hoses are stretched (the blood vessels,) and we need water (the blood within the vessels.) For this system to be effective, all three components must be working efficiently and remain sealed. If even one of these components becomes compromised, such as a pump failure, a change in size or a leak in a blood vessel, or even a loss of blood can adversely affect the smooth delivery of oxygen to the tissues along with collection of waste products produced by the body.

The heart is responsible for creating the force required to push the blood throughout the body and the lungs. If disease or injury interferes with the heart's ability to maintain a constant pressure (Cardiogenic) within the body's hydraulic system, then normal tissue perfusion will be affected. Arteries and veins have a certain amount of tone or tension on the vessel walls to aid in maintaining the optimal operating "pressures" within the system. This tone is controlled by the brain and information is transferred via the spinal cord. If there is a potential spinal cord injury (Neurogenic) and information is not delivered to the vessels, they will dilate to their widest diameter. The problem that occurs is now the pressure within the system will drop as the "container" or amount of space to be filled has become much bigger and blood pools in the outer parts of the body. Think of it as pumping into 45mm handline with an expected volume and pressure at the nozzle. Now, imagine that handline has been replaced with a 100mm line. What happened to the pressure at the end of the line? Speaking of volume...what would happen to the pressure and



expected volume at the nozzle if the line (vessel) had a hole and water was escaping from the line? This is what occurs when blood is lost from soft tissue injury or more severe internal trauma (Hypovolemic.) If we cannot contain the blood with the "closed system" then we have compromised one of the components and the end result will be shock. Hypovolemia can also be caused by severe dehydration, but we'll concentrate on traumatic causes.

So, now that we know about the heart (pump,) blood vessels (pipes or tubes,) and blood (fluids,) what does this all mean and what will we see if there is a system failure. There are a number of signs and systems that will help lead us to recognizing shock. Our initial or primary assessment and baseline vitals will help identify signs of impending shock. The patient's response to the injury or condition is based on what stage of compensation the body is in. Compensation is best described as the degree of defense the body is able to wage against the loss of pressure. Compensated shock is the initial stage in which the body will attempt to maintain normal bodily function by constricting blood vessels (vasoconstriction) which in turn maintains the required pressure for tissue perfusion. Signs and symptoms typically seen in this stage may include a normal level of consciousness (LOC), a slight increase in the pulse rate, little if any change in blood pressure, breathing and skin also may appear normal. In many cases the patient may not have any serious complaints depending where the bleed has occurred. As blood loss continues, the body may be having difficulty maintaining pressures and eventually fall into the "decompensated" stage. The ongoing volume loss has caused the body to shunt blood away from the arms and legs toward the vital organs. The LOC may now be altered, even confusion may be present. The skin will become pale, cool, and moist. The pulse will begin to increase but the strength will diminish, especially at the wrist as blood is directed toward the core organs. Capillary refill will also become delayed. The respiratory rate will also increase due to the demand for more oxygen by the brain. As volume continues to be lost, the above vitals continue to deteriorate and a late and ominous sign is a drop in blood pressure. As pressure decreases, the brain and vital organs may be damaged as a result of the decreased perfusion and eventual death of tissue may occur leading to "irreversible" shock. This stage indicates the complete break down of the body's defense. Blood vessels cannot maintain any pressure and blood will begin to pool. The result is permanent damage to major organ tissue which commonly leads to the death of the patient.

So what does all this mean for you? Your basic first aid skills can assist with bleeding control, providing warmth, proper positioning and providing oxygen if so equipped. However, a thorough primary assessment including ongoing vital sign assessment along with a high index of suspicion based on the area of injury or the patient's complaints may provide the highest chance of a successful outcome. Assess the patient, assess the mechanism of injury, the area of injury and listen to what the patient is telling you. Their life may depend on it.

derekhicks

Derek is a 1st Class Career Firefighter with the City of Niagara Falls, Ontario and is also a member of the Auto Extrication Team competing at the International level. He has 18 years of past experience as a practicing paramedic in the Niagara Region. Derek welcomes any comments and correspondence at dhicks104@hotmail.com.

Window Frame Aids in Extrication

It has been almost 6 years since I first published this article. The purpose of the article was to highlight a technique that would show alternatives to creating a purchase point right at the Nader Bolt.

The fact that a tool was used to spread first to create the purchase point was not the point of the article.

A Pry Axe or Halogan Tool would have worked also.

The main point of the article was to create a purchase point created higher up – well above the nader bolt, in this case the window frame.

This starts the process of initiating and eventually ending up with a wide and deep “V” Shaped opening to insert the Spreading Tool (on a downward angle) enabling us to “Roll” the door off the nader bolt.

When training, try making a purchase point well above the nader bolt (or hinge).

One of the most overlooked and under-utilized portions of most vehicles is the window frame. Rescuers usually shy away from using this handy and surprisingly strong part of the vehicle. We can create a “V” in spreading a door off a nader bolt using a typical door purchase point, higher up in the door, well above the nader bolt. If the integrity of the door skin is being compromised by tearing, we immediately re-position the spreader (in this case Hurst Maverick Combination Tool) a little higher up and use the window frame’s integrity to initiate the creation of the “V” configuration in popping the door. In Figure 1, we create a small opening with the Maverick and utilize a wedge to maintain the gains we’ve achieved. Next, in Figure 2, we reposition the Maverick higher up and spread the window frame away from the “B” post. With the tips on a slight downward angle, we enhance the opening, which forms the shape of a “V” and we are almost ready to “pop” the door. This technique minimizes tearing and should always be considered if the door skin starts to tear. In Figure 3, for the final push, we lower the Maverick’s tips into the upper part of the door, into the “V”, immediately below the window frame. Maintaining the same downward angle we are a moment away from popping the door off. This is a practical tip that should be used more often, especially when tearing the door skin is an initial problem.

–CC



Figure 1



Figure 2



Figure 3

PRODUCT REVIEW: Air Bags

Whether Lifting a Multi Ton Tank, or a Mini Cooper, there is always a right and a wrong way to do a lift.

Code 4 Fire & Rescue has sold Multiple Sets for lifting these Heavy Duty Military Tanks.

Here, I have positioned 4 x 74 Ton Hurst/Vetter High Pressure Air Bags to lift these Tanks so that damaged armored tracking can be replaced in the field.

In this case, up front, on the left side of the Tank, is a pair of Hurst/Vetter 74 Ton High Pressure Air Bags in a stacked formation. A second stacked pair of Hurst/Vetter 74 Ton High Pressure Air Bags is positioned along the left side as well, but more rear-ward and are not visible (behind the front Air Bags).

With a Simultaneous Lift, we are easily able to raise the Left Side of the Tank to change the track.

The Hurst/Vetter Controls, Bags, and Hoses are exactly the same as those we continually sell to the Fire Service in Canada. —CC

Our Hurst Vetter 2 Bag 54 Ton System



We have sold hundreds of this system!



**Hurst/Vetter High Pressure Air Bags:
Built with Durability!**

CODE4: Canadian System Sales

Recent Sales: 126 Systems

Hurst High Pressure: 31 Systems



SF310

S510 or S311

TRIMO

3 HOSES

T-59

Saint John FD; Pickering OPG Nuclear; North Middlesex FD; Lambton Shores, Northville Station; Seneca College; Pickering FD (3 Systems), North Rustico FD, Chatham-Kent FD, Springfield FD, Port Hawkesbury FD, Inverness FD, Oliver-Paipoonge FD #1, Oliver-Paipoonge FD #2, Glencoe FD, Grand Valley FD, Chippewas-of-Thames FD, Bruce Nuclear FD, Quinte West FD, Walkerton FD, Grand Bend FD, Orillia FD North Middlesex FD, Eel Brook FD, Advocate & District FB, Summerville & District FS, Prince Edward County #1, Prince Edward County #2

Hurst Low Pressure: 60 Systems



MOC II or X-TRACTOR II

TRIPLE PUMP

3 HOSES

T-59

ML-28 DEFENDER

MAVERICK

Milton FD; Woolwich FD; Cambridge FD; Blue Mountains FD; Brook Alvinston FD; Center Hastings FD; St. Catharines FD; Hamilton Airport FD; Riverside-Saint Albert FD; Saint-Jacques FD; Hillsborough FD; Salmon River FD; Whitestone FD; North Bay FD; Quinte West FD; Temagami FD; Sault Ste Marie FD; Sault Ste. Marie (2 Systems), Atomic Energy, Vaughan FD, Collingwood FD, Hamilton FD (6), Brampton FD (4), Whitby FD, Clarington FD, Echo Bay FD, Onslow-Belmont FD, St. Andrews-by-the-Sea FD, Westville FD, Weymouth FD, US Steel FD, Niagara Falls FD, Miramichi FD, Haldimand County FD

Hurst/Vetter Airbag Systems: 35 Systems

Cambridge FD (2 Sets); Manitowadge FD; Pickering OPG Nuclear FD; Hillsborough FD; Haldimand County FD; Milton FD; Sault Ste. Marie FD (1); Sault Ste. Marie FD (2); Atomic Energy FD; Kingsville FD (2); Stirling-Rawdon FD; Hamilton FD (6); Brampton FD (2); Prince Edward County FD (2); Fort Erie FD (2); Mississauga FD (2); Haldimand County FD (4); Norfolk County (2); South Dundas FD; Niagara-on-the-Lake FD; Westville FD; Marten River FD; Miramichi FD; Shuniah FD; Whitby FD; Edmunston FD; DND (30 Systems).



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