Homeland Security
Science and Technology

Summary

U.S. Department of Homeland Security
SAVER
System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts unbiased operational tests on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL). The SAVER Program mission includes:

- Conducting impartial, practitioner relevant, and operationally oriented assessments and validations of emergency responder equipment;
- Providing information that enables decision makers and responders to better select, procure, use, and maintain emergency responder equipment.

Information provided by the SAVER Program will be shared nationally with the responder community, providing a life-saving and cost-saving asset to DHS, as well as to federal, state, and local responders.

The SAVER Program is established and supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

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Multipurpose Cutoff Saw Blades

As a part of the System Assessment and Validation for Emergency Responders (SAVER) Program, Texas A&M Engineering, including Texas Engineering Extension Service (TEEX) and Texas Transportation Institute (TTI), conducted a comparative assessment of multipurpose cutoff saw blades. The findings are presented in the Multipurpose Cutoff Saw Blades Assessment Overview*, which is available by request at https://www.rkb.us/saver.*

Background

While many blades are designed for cutting specific materials (e.g., for cutting concrete), multipurpose cutoff saw blades are designed to be used as a single tool for cutting multiple materials. The intent is to allow the user operational flexibility without the burden or necessity of changing blades between applications.

A focus group consisting of 11 emergency responder subject matter experts (SMEs) was held by Texas A&M Engineering in January 2007 to identify relevant operating scenarios and provide guidance on test considerations for multipurpose cutoff saw blades. The focus group identified the most common potential applications for these types of blades as forcible entry for law enforcement and firefighting applications, roof breaching for firefighting and rescue applications, and structural collapse applications. They also defined that the overall effectiveness of a multipurpose cutoff saw blade depends on how well and how quickly a single blade can safely cut through plastic, glass, metal, masonry, and wood (figure 1).

Figure 1. SMEs cut airport runway concrete using multipurpose cutoff saws and test blades.

Assessment

Several taskings made up the activities for the saw blade testing. These include cutting of structural wood cribbing, 1/2-inch grade 8 bolts, composite roofing material, glass block, plate steel, and cured concrete. Emergency responder SMEs also evaluated blade durability at the conclusion of the testing. At the conclusion of the assessment, SMEs provided feedback about system usability. The feedback includes rating the usability of the blades on different media (e.g., wood, steel, etc.) as well as written feedback about what the SMEs felt they would want other responders to know about the blades.

Six different multipurpose cutoff saw blades from five different manufacturers were included in the assessment. These blades are marketed as being able to cut plastic, glass, metal, masonry, and wood. The blades represented the known market at the time of the assessment, based on a market survey conducted by Texas A&M Engineering in March 2007. The selected blades included:

- Cutters Edge Black STAR Diamond Rescue Blade (*Cutters Edge Black STAR*)
- Dixie Diamond Manufacturing, Inc. PC Pipe Cutter & Rescue Blade (*Dixie PC & Rescue*)
- MK Diamond Products, Inc. Fire Tiger Tooth (*MK Tiger*)
- National Industrial, Building, and Construction Supply "Chunk" Carbide Rescue Saw Blade (*NIBCS Chunk*)
- National Industrial, Building, and Construction Supply Monsoon Electroplated Rescue Saw Blade (*NIBCS Monsoon*)
- Norton (Saint-Gobain Abrasives, Inc.) Rescue Runner Blade (*Norton Rescue Runner*).

Assessment Results

Six emergency responder SMEs participated in the assessment. The group included a volunteer firefighter/retired detective, an active detective, a paid firefighter, paid fire captain, paid fire battalion chief, and a paid fire lieutenant/volunteer fire assistant chief. The emergency responder practitioner SMEs included instructors and specialists in hazardous materials, logistics, confined space operations, communications, incident support, and incident command.

The evaluators rated the saws based on the evaluation criteria established by the focus group and prioritized within three of the five SAVER categories (capability, usability, and affordability) (figure 2). Complete assessment results and SME comments are contained in the full assessment report.

Figure 2. An emergency responder SME cuts composite wood roofing.

Table 1 lists the composite and SAVER category scores for multipurpose reciprocating saw blades based on a maximum score of 100 points.

The following sections provide a brief summary of SAVER category scoring and evaluator comments on each assessed system.

MK Diamond Products, Inc. Fire Tiger Tooth

The *MK Tiger* blade was the highest rated of the test set and scored in the top half of the group for affordability, capability, and usability (it tied for highest capability score). The emergency responder SMEs did note some fouling problems during the composite roof cutting scenario.

Dixie Diamond Manufacturing, Inc. PC Pipe Cutter & Rescue Blade

The *Dixie PC & Rescue* blade rated very close to the MK Tiger blade and scored in the top half of the test set for capability and usability (it tied for highest capability score and had the highest usability score). The SMEs in general felt the blade was useful for all applications but one SME recommended it not be used for roof cutting operations.

Norton (Saint-Gobain Abrasives, Inc.) Rescue Runner Blade

The *Norton Rescue Runner* blade scored in the top half of the test group for capability, but multiple SMEs noted problems with the blade during the composite wood roof cutting; it was also the most expensive blade in the test set.

Table 1. SAVER Category and Composite Scores for Multipurpose Cutoff Saw Blade Emergency Response Applications[a]

Saw Blade	Composite Score	Affordability (.11 Overall Weighting)	Capability (.48 Overall Weighting)	Usability (.41 Overall Weighting)
MK Tiger	**77**	77	79	75
Dixie PC & Rescue	**76**	59	79	77
Norton Rescue Runner	**65**	17	78	64
Cutters Edge Black Star	**59**	50	54	68
NIBCS Chunk	**43**	96	35	38
NIBCS Monsoon	**43**	100	32	41

Note:

[a] Scores contained in the report may be listed in a different numerical scale. For the purposes of the SAVER Summary, scores are rounded to the nearest whole number.

Cutters Edge Black STAR Diamond Rescue Blade

The *Cutters Edge Black STAR* blade rated in the top half of the test set for usability, but the SMEs were not able to cut wood, concrete, or steel as efficiently with it as they were with higher rated blades. Two SMEs noted problems with the blade for cutting the composite wood roof, but others indicated it provided average to good performance "all-around."

NIBCS "Chunk" Carbide Rescue Saw Blade

The *NIBCS Chunk* blade was very affordable, but it performed in the bottom half of the test set for capability and usability (it had the lowest usability score). SMEs raved about the blade's ability to cut wood and composite roof, but were adamant those are the only applications it should be used for, because of the problems they encountered with it in the assessment for cutting 1/2-inch plate steel and cured concrete. They experienced serious safety issues with the blade due to metal shrapnel that was flung from the blade in steel and concrete cutting applications.

NIBCS "Monsoon" Electroplated Rescue Saw Blade

The *NIBCS Monsoon* blade was the most affordable of the group, but it performed in the bottom half of the test set for capability and usability (it had the lowest capability score). SMEs had problems with blade warping due to its thinness and inability to dissipate heat for the concrete and composite wood roof cutting applications. The SMEs also had problems with mounting the blades on the Unifire Model PS-COS 1479 saws used for the assessment because the blade arbor sizes were too small.

Conclusion

Emergency responder SMEs used the multipurpose cutoff saw blades for a variety of emergency response–related applications: cutting plate steel, hardened bolts, structural timber, composite wood roofing, glass, and concrete (figure 3). Performance differences for different blades were identified by the group of six SMEs based on how fast they were able to cut structural wood cribbing, plate steel, and glass. SME observations of the usability of the different blades for the response applications were also compared. The SMEs rated the durability of the blades after they had been used in the different applications by comparing wear, damage, or warping with new blades. Manufacturer's Suggested Retail Price cost information was also identified.

The MK Tiger and Dixie PC & Rescue blades had the highest overall scores in the test set, followed by the Norton Rescue Runner and Cutters Edge Black STAR. The NIBCS Chunk

Figure 3. SMEs cut glass block as part of the multipurpose cutoff saw blade test.

and NIBCS Monsoon blades, the most affordable in the test set, had the lowest overall scores.

All reports in the series, as well as reports on other technologies are available on the SAVER Web site (https://www.rkb.us/saver).