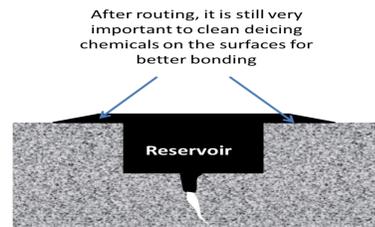


# Cleaning Device to Remove Debris and Chemicals for Crack/Joint Sealing

## Introduction & Problems

- Over fifty percent of the US interstate system is classified in fair or poor condition.
- Loss of adhesion causes most crack sealing failures
- Traditional air blasting is less effective in cold weather climates due to de-icing chemicals.
- FHWA recommends abrasive crack cleaning methods such as water blasting or wire brushing
- The pavement surface is often ignored during crack preparation
- Labor costs of current crack cleaning/sealing processes are extremely high.



Elevation view of routed crack after sealing



Crack Sealing Process

After routing, it is still very important to clean deicing chemicals on the surfaces for better bonding

## Innovative Versatile Crack Cleaning Device

### Design Concept:

Brushing

Pneumatic power = Routing + air blasting

Cutting



Simple Chicago fitting connection with existing air compressor



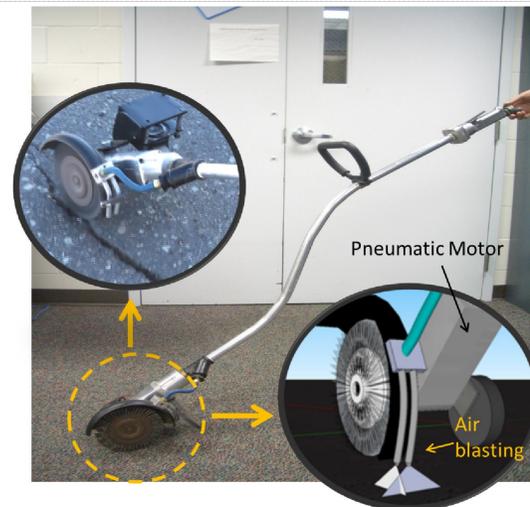
Wire brush: Cleaning cracks



Router: Excavate cracks



Masonry blade: Pothole repair



### Conventional Preparation Method vs. Proposed Preparation Method

	Non-Routing	Comments		Routing	Comments
<b>Traditional</b>	Air blasting -> sealing	Does not effectively remove de-icing chemicals and vegetation	<b>Traditional</b>	Routing -> air blowing -> sealing	Not effective for wide cracks. Also, routing cannot clean top surfaces of cracks which promotes better bonding between surface and sealant material.
<b>Proposed device</b>	Wire brushing & air blasting -> sealing	Remove de-icing chemicals and vegetation + air blasting = one process	<b>Proposed device</b>	Routing -> wire brushing & air blasting -> sealing	A brush effectively prepare top surface of cracks while air blasting cleans inside and outside of the routed crack simultaneously.

Conventional and Proposed Preparation Method Overview

## Crack Size for Sealing

- Crafco Inc. defines cracks  $\geq 1/8''$  (about 3mm) generally require sealing.
- Materials and Procedures for Sealing and Filling Cracks in Asphalt-Surfaced Pavements (FHWA-RD-99-147)<sup>2</sup> recommends crack sealing for 5 to 19 mm width of cracks.
- Unified Facilities Criteria (UFC) provides guidelines for crack preparation based on crack size as follows:



Graphical representations of typical crack sizes (from UFC 3-270-02)

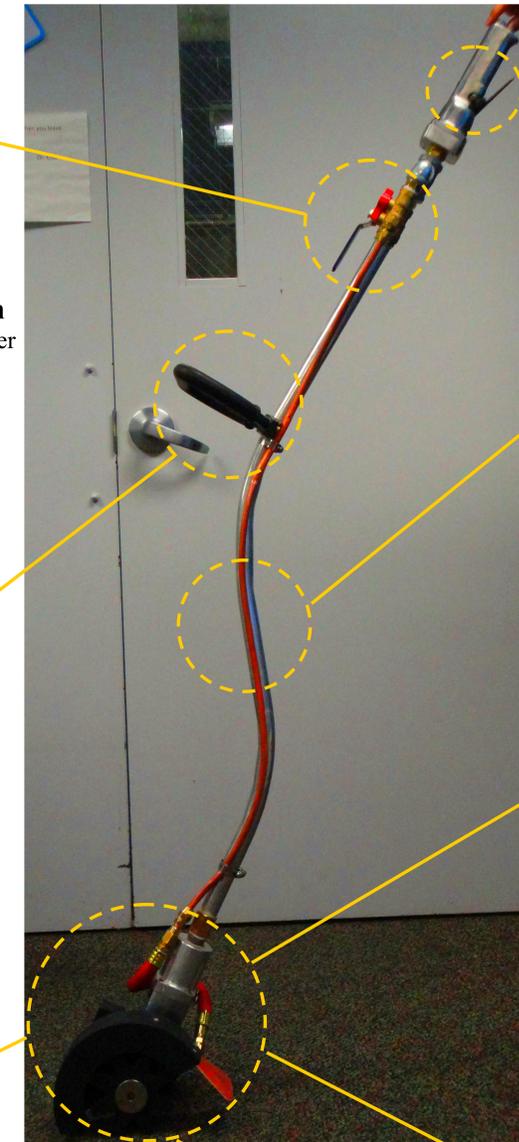
## Innovative Versatile Crack Cleaning Device



**Air Flow Splitting Design**  
One for running motor, the other for air blasting to clean debris



**Air Amount Control Switch**  
A convenient trigger mechanism



**S-shaped Shaft Design**  
More comfortable to use for a prolonged period of time compared to the straight one because the s-shape of the shaft allows the operator to stand more erect while pushing down on the device



**Handle**  
Designed for the hand not pulling the trigger



**Wire Brush**  
Cleaning Cracks



**Router**  
Excavate cracks



**Masonry Blade**  
Pothole Repair



**Replaceable Brush Design**  
A low cost alternative to simply and effectively prepare pavement cracks and joints for sealing or filling



**Guiding Wheel with Height Adjustable Assembly**  
Give the operator a choice in the setting the minimum crack depth



**Pneumatic Motor, Angle-adjustable air nozzle, and Debris Guard**  
The increased debris guard was suggested not only for the safety and protection of the operator, but also for passing vehicles and pedestrians. The adjustable nozzle trajectory using a funnel was suggested to blow out debris away from the crack to the side of the roadway no matter what the direction the device is moving.

## Contact

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