



RoadQuake® Safety System Product Guide



# TABLE OF CONTENTS:

PAGE  
**03** | WHO WE ARE

PAGE  
**04** | ROADQUAKE®  
SAFETY SYSTEM

PAGE  
**06** | ROADQUAKE® 2F  
TPRS\*

PAGE  
**14** | ROADQUAKE®  
RAPTOR®\*\*

PAGE  
**20** | CRIB®  
CARRIERS

PAGE  
**24** | ROADQUAKE® 2F  
RETRIEVAL SYSTEM

*\*Temporary Portable Rumble Strip*

*\*\*Rumble Strip Handling Machine*

# WHO WE ARE

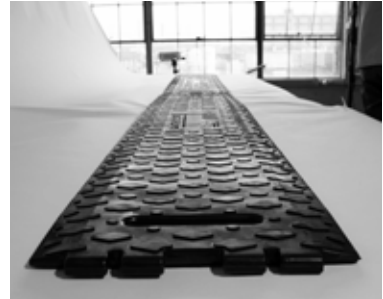
## WE ARE PSS:

For over 30 years, PSS has crafted breakthrough solutions that can safeguard worksites and save lives. We are powered by dedicated, creative people and fueled by continuous innovation.

Our focus is on the right-of-way — that point in time and place where motorists, workers, and pedestrians intersect and interact. Our goal is to design products and services that provide safe travels so that everyone can return home safely at the end of the day.

We don't just talk about Innovations for Safety® — we live it. We believe that audacious ideas and hard work produce outstanding results.

Our important work on, around, and through the right-of-way will result in real solutions for real people. Through continuous innovation and with consultation, education, and training, we work to save lives today, tomorrow, and for decades to come.

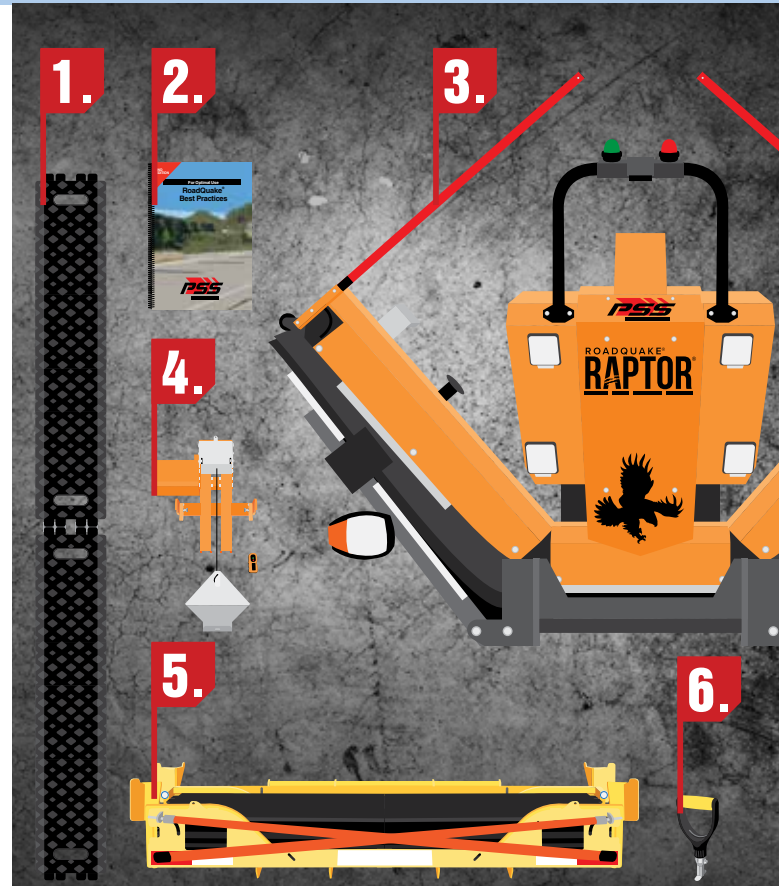


# ROADQUAKE® SAFETY SYSTEM

## ROADQUAKE® SAFETY SYSTEM:

RoadQuake® Safety System helps workers deploy and retrieve RQ TPRS arrays faster and safer. Workers' exposure to live traffic is reduced.

- 1. RoadQuake® Temporary Portable Rumble Strip (RQ TPRS):** Designed to reduce accidents and save lives, RQ TPRS alerts drivers to changing road conditions. RQ TPRS is the fundamental component of RoadQuake Safety System.
- 2. RoadQuake Best Practices Guide** provides users with deployment, retrieval, and maintenance practices to achieve optimal performance of RQ TPRS.
- 3. RAPTOR® Rumble Strip Handling Machine** transports, deploys, retrieves, and realigns RQ TPRS in work zones. Keeps workers off the road and safer.
- 4. RoadQuake® Retrieval System** pulls RQ TPRS into CRIB with little manual effort. Reduces workers' exposure to live traffic and reduces manual exertion, possible injury.
- 5. CRIB® Carriers** helps workers deploy and retrieve RQ TPRS. Reduces workers' time in live traffic.
- 6. RoadQuake T-Handle** reduces the potential for superficial injury caused by manually lifting and carrying RQ TPRS.

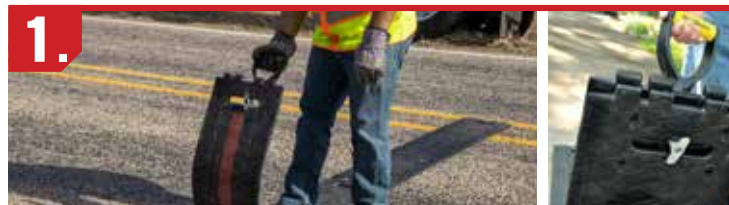


## ROADQUAKE® 2F DEPLOYMENT METHODS:

Compared to manual handling, users can deploy and retrieve RQ TPRS faster and safer with PSS handling equipment.

1. Deploy and retrieve RQ TPRS manually with RoadQuake® T-Handle.
2. Deploy and retrieve RQ TPRS with RoadQuake® 2F CRIB® Carrier. Or deploy with CRIB and retrieve with CRIB and RoadQuake® 2F Retrieval System.\*
3. Use RoadQuake® RAPTOR® Rumble Strip Handling Machine to transport, deploy, realign, and retrieve RQ TPRS. RAPTOR keeps workers safely off the road.

*\*CRIB and Retrieval System sold separately.*



# ROADQUAKE® 2F TPRS

## ROAD SAFETY REINVENTED:

In 2009, PSS, formerly Plastic Safety Systems, introduced a revolutionary traffic safety countermeasure, RoadQuake® Temporary Portable Rumble Strip (RQ TPRS). We introduced RoadQuake Modular TPRS in 2012 and RoadQuake 2F Folding TPRS in 2014.

Designed to reduce accidents and save lives, RQ TPRS alerts drivers, especially distracted drivers, to changing road conditions like work zones.

RQ TPRS is a transverse rumble strip installed perpendicular to the direction of travel with the purpose of alerting drivers' three senses:

- » Seeing an array of strips across the road.
- » Feeling the vibration caused by tires traveling over strips that measure ¾" high.
- » Hearing the familiar sound of tires traveling over rumble strips.

Sounds and vibrations generated by RQ TPRS are significant. A University of Kansas Transportation Center study determined that RQ TPRS conveys sound and vibration at levels similar to ground-in, or milled, permanent rumble strips.



Prototype 9, Fall, 2007



Since its inception, PSS has tested more than 75 different versions of RQ TPRS. We continually work to improve a device that is already an effective countermeasure so that its implementation becomes universal.

Please see the RQ TPRS section of this guide for a description of our latest improvements.

From our continual testing procedures and product improvements, we have also developed an extensive body of knowledge. We consider ourselves the leading authority in the manufacture, design, and performance of transverse TPRS. Please take advantage of our expertise.

As FHWA recently rescinded the Proprietary Rule, state Departments of Transportation can now specify products like RQ TPRS and RAPTOR® Rumble Strip Handling Machine on federally funded projects.

Our innovative countermeasures can reduce accidents and save lives in work zones. For a product, please contact a Roadway Safety Consultant near you by visiting [pss-innovations.com/our-team](http://pss-innovations.com/our-team).



# ROADQUAKE® FEATURES

## ROADQUAKE® 2F TPRS FEATURES:

Designed to reduce accidents and save lives, RoadQuake 2F TPRS alerts distracted drivers to changing road conditions like work zones and checkpoints.

### TEMPORARY:

- » Ideal for work zones where daily installation and removal is required.
- » Quick installation and removal. No cleanup required.

### PORTABLE:

- » Transport RoadQuake® 2F TPRS with handling equipment like RoadQuake® CRIB® Carrier or RAPTOR® Rumble Strip Handling Machine.
- » Manually deploy and retrieve by a two-person crew.

### DURABLE:

- » 3-5 year life under normal conditions.
- » Suitable for use in the rain and in temperatures as low as 0° F and as high as 180° F.
- » For use in posted speed limits up to 80 MPH.

## ROADQUAKE 2F TPRS FEATURES (CONT'D):

- » Generates the same level of sound and vibration as milled strips.
- » 13" W x 3/4" H x 132" L when unfolded. Covers the width of an entire lane.
- » Folds to a compact 66" length. Weighs 105 lbs.
- » Ergonomic handles make installation and storage easy. The non-slip textured surface helps to keep RoadQuake 2F TPRS in place.
- » Bevels on both sides of RoadQuake take the guesswork out of a correct installation.
- » Meets Section 6F.87 of the MUTCD, 2009 Edition.

*US Patent No. 7,736,087. Other Patents Pending*





## ROADQUAKE TPRS APPLICATIONS:

In December, 2008, we introduced our first commercially viable RoadQuake Temporary Portable Rumble Strip (RQ TPRS) traffic safety countermeasure.

Since then, users have deployed RQ TPRS arrays in thousands of work zones. Collectively, those strips have experienced well in excess of 5 billion vehicle hits, from motorcycles and sub-compacts to farm equipment and 80,000 lb. semi-trailers.

Field evidence overwhelmingly demonstrates that RQ TPRS effectively alerts distracted drivers, possibly reducing crashes and saving lives, in work zones.

Ten years ago, we described RQ TPRS as ideal for work zones where daily installation and removal is required.



That statement, still in use, still accurate, captured our vision of the initial RQ TPRS application: work zone projects on secondary, two-lane roads with two-way traffic, usually with flagging or pilot car operations, at 45-50 MPH posted speed limits.

Since its introduction, we steadily increased the upper limit of RQ TPRS speed tolerances to 80 MPH, and the spacing distances between deployed strips. Concurrently, we developed a line of handling technology, to better protect workers who deploy and retrieve RQ TPRS.

## EXPANDED RQ TPRS APPLICATIONS:

With RAPTOR Rumble Strip Handling Machine, we can now recommend RQ TPRS in work zones beyond single lane, lane-closure applications. With RAPTOR, users can effectively deploy RQ TPRS in high-speed, high volume, multilane roadways. RAPTOR also allows use of RQ TPRS in most short-term, short-duration mobile work zone operations.

RQ TPRS and our ancillary handling equipment can help reduce distracted driving, protect workers, and possibly save lives in your work zones. Let us show you how.

Please visit [pss-innovations.com/our-team](https://pss-innovations.com/our-team) to contact your PSS Roadway Safety Consultant for a product demonstration.

# ROADQUAKE® OPTIMIZATION

## ROADQUAKE BEST PRACTICES GUIDE:

We produced our Best Practices Guidebook to provide users with safe, effective methods to achieve optimal performance of RQ TPRS.

In our guidebook, the reader will find information PSS has obtained through internal field-testing. To that knowledge, we have added information derived from users' field experiences in active work zones.

The guide book features our recommended best practices in:

- » Array configuration and placement
- » Manual deployment and deployment with handling equipment
- » Monitoring deployed arrays
- » Recommended traffic control plans
- » TPRS movement and allowance guidelines

Other features new to the 2nd Edition include:

- » RQ TPRS product improvements
- » State DOT traffic control plans
- » Types of road surface conditions
- » New typical application drawings
- » RQ TPRS and Portable Positive Protection

Our guidebook is an accurate source of practical information for the optimal use of RQ TPRS and a worthy complement to the personal field training we offer.





## ROADQUAKE RECYCLING PROGRAM:

As a responsible, innovative manufacturer, PSS routinely seeks opportunities to act as a good steward of the environment.

As such, we recently created the “PSS RoadQuake Reclaim!” Program, a recycling program for RoadQuake Temporary Portable Rumble Strips (RQ TPRS). PSS will now pick up users’ strips that have reached the end of their service life and dispose of them in an environmentally conscious manner. Our program offers users a more environmentally friendly, cost-effective, convenient option than disposing of RQ TPRS in a landfill.

Users should routinely inspect their TPRS inventory and examine each TPRS for damage or wear. (See our “Best Practices Guide” for our recommended inspection procedure.) Users can then segregate those that have reached their end-of-service life.



Under our “PSS RoadQuake Reclaim!” Program, users simply:

- » Collect enough end-of-service life RQ TPRS to fill a pallet: 24 each RoadQuake 2F TPRS, and 36 each RoadQuake 2 Modular TPRS.
- » Contact your local PSS Roadway Safety Consultant. (Visit [pss-innovations.com/our-team](http://pss-innovations.com/our-team) to obtain contact information.) Advise your safety consultant of the type of TPRS and quantity collected for recycling.
- » Band and shrink-wrap TPRS on a pallet. TPRS must not hang over the pallet edges.
- » Once ready for shipment, e-mail a photo of the pallet to your safety consultant.

That’s it. PSS will arrange for a return shipment to our nearest disposal and recycle facility **at no charge to the user!**

PSS will dispose of the strips using best practices for the material and for the environment. Whenever possible, we will salvage and recycle material from the returned RQ TPRS.

Together we can reduce unnecessary waste. Together we can serve as good stewards of the environment.

# ROADQUAKE® PRODUCT IMPROVEMENTS

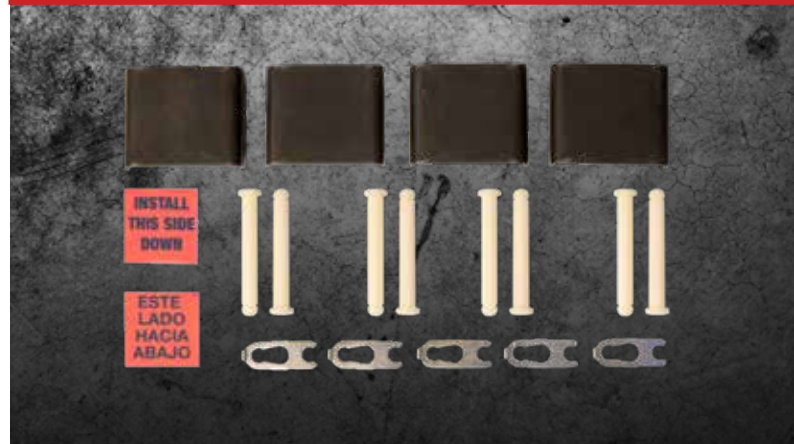
## NEW PIN CONNECTION:

PSS recently replaced the metal chain link hinges with Breakaway Pin Connections. The Breakaway Pin Connection is designed to separate only under significant stress of an incident.

With Breakaway Pin Connections, tabs should not routinely tear or crack due to an incident. Should an incident occur, the pins should break away and leave the tabs intact.

We call this a “clean separation”. As the tabs are not damaged during a “clean separation”, users can simply replace the breakaway pins, and return the strip to service. As such, our Breakaway Pin Connections can extend the service life of a RQ TPRS.

Breakaway Pin Connection Replacement Kits are sold separately.



## INSTALLATION GUIDANCE:

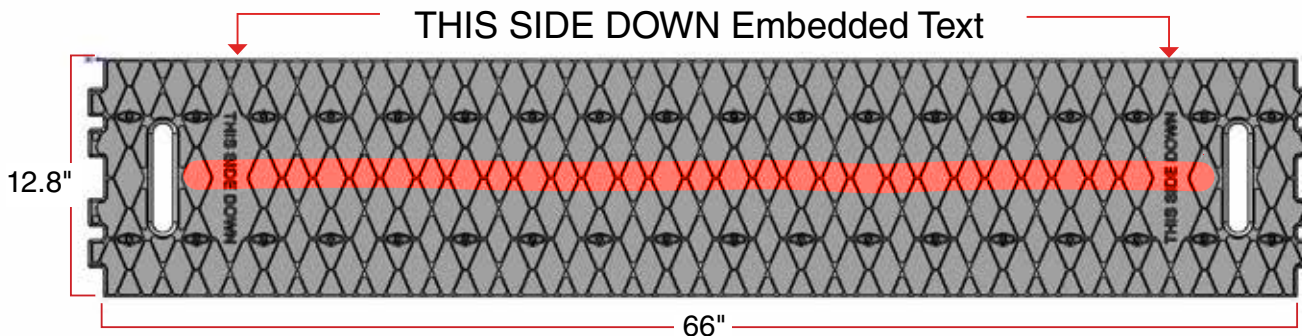
To reduce the possibility of “upside down” deployments, we have added several warnings to each RoadQuake TPRS:

- » Embedded text reads THIS SIDE DOWN on the bottom side of the strip in four places, near the handles.
- » A red stripe runs down the center of the bottom side most of the length of the strip.
- » Red “INSTALL THIS SIDE DOWN” warning labels, in English and Spanish, are applied to two brackets of each strip.

The warnings send a clear message to workers who deploy RQ TPRS: the text, labels, and red stripe should face the roadway. If strips are deployed correctly, workers will not see the warnings. If strips are deployed incorrectly, bottom side up, workers will see all of them and must re-deploy the strips.

In addition to the warnings that appear on each strip, a “Caution!” postcard in both English and Spanish accompanies each strip at time of shipment. The card shows users how to deploy RoadQuake TPRS correctly, or “right side up”, with no warnings visible.

Field tests in active work zones indicate that the warnings effectively direct workers to deploy strips correctly.



*Embedded Text and Red Stripe on Bottom of RoadQuake 2F TPRS (1/2 Strip Shown)*

# ROADQUAKE® RAPTOR®

## RAPTOR RUMBLE STRIP HANDLING MACHINE:

RAPTOR transports, deploys, realigns, and retrieves RoadQuake 2F TPRS in work zones. RAPTOR keeps your workers off the road.

RAPTOR revolutionizes the usage of RoadQuake 2F TPRS:

- » Workers operate RAPTOR from the safety of the vehicle. Workers no longer deploy or retrieve RoadQuake 2F TPRS manually.
- » Workers no longer risk superficial injuries that could be caused by lifting objects like RoadQuake.
- » Deploys a three-strip array in under 90 seconds and retrieves a three-strip array in under 2.5 minutes.

## RAPTOR IMPROVES WORK ZONE SAFETY:

- » RAPTOR extends the practical use of RoadQuake 2F TPRS in work zones.
- » With RAPTOR, RoadQuake is now ideal for most short-duration, short-term, and mobile operations.
- » RAPTOR can provide protection in work zones.
- » RAPTOR mounts to the front of the vehicle. The back of the vehicle is free for other safety equipment like a Truck or Trailer Mounted Attenuator (TMA).



TRANSPORT



REALIGN



RETRIEVE & DEPLOY

## FUNCTIONS OF RAPTOR:

In the pictures on right, RAPTOR, shown in Operational Mode, simulates deployment of RQ TPRS:

1. Magnet Bar pulls one RQ TRPS from TPRS Tray to deploy on road surface.
2. RAPTOR Arm moves out from and in front of TPRS Tray.
3. Arm moves down to deployment location of RQ TPRS.
4. Magnet Bar releases RQ TPRS at installation location.

To deploy more strips, return RAPTOR Arm and Magnet Bar to TPRS tray. Pick up another strip for installation, repeat until installation is complete.

Use the same functions of RAPTOR, though in reverse order, to retrieve and remove RQ TPRS from the work zone.

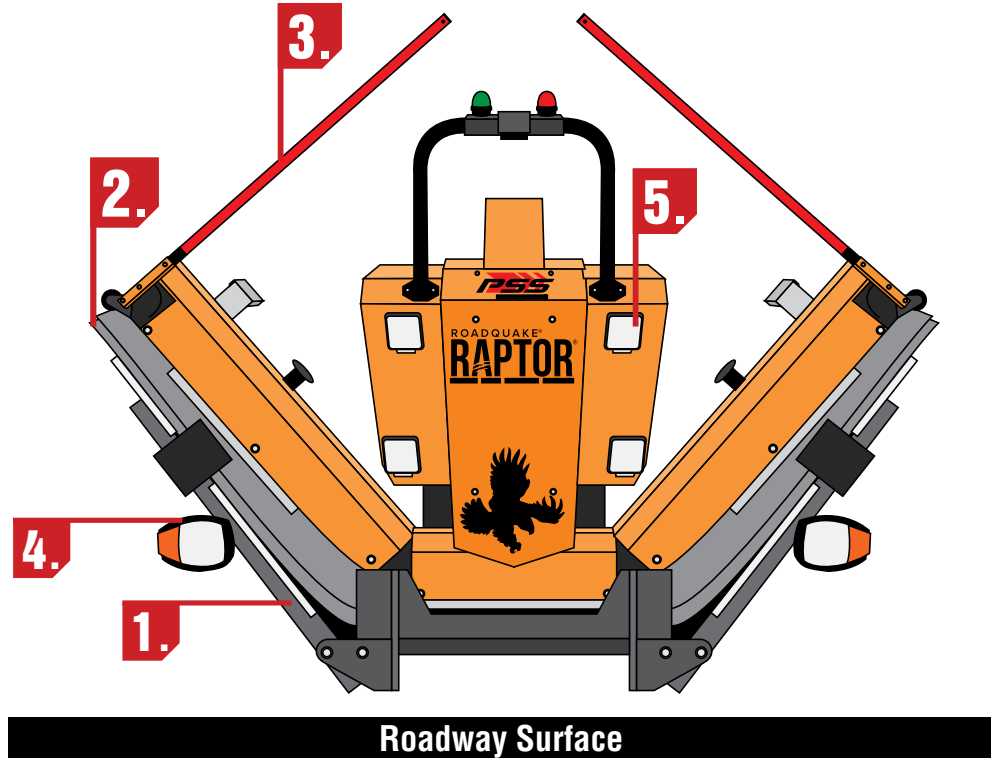


Patent Pending

# RAPTOR® MODES

## TRANSPORT MODE:

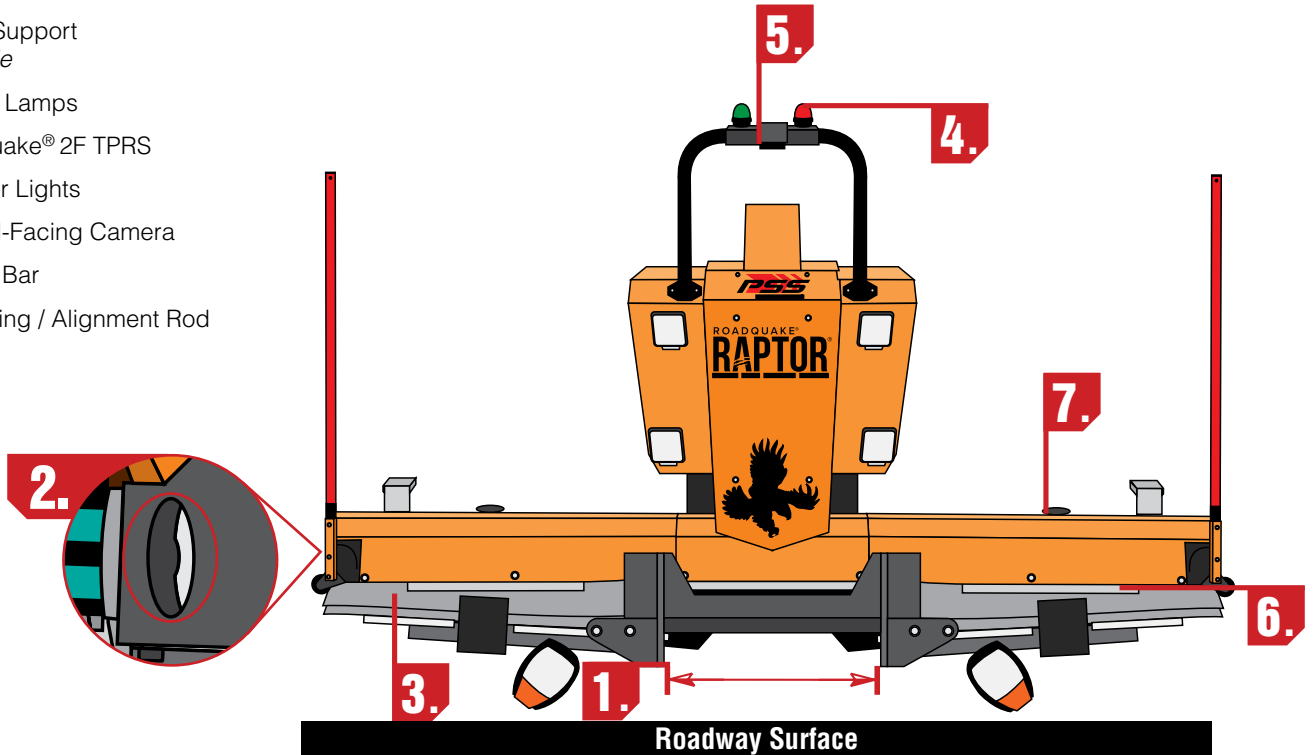
- 2. TPRS Tray
- 3. TPRS  
*0-12 Strips*
- 4. Folding Guide Marker
- 5. Auxiliary Headlights
- 6. Work Lights





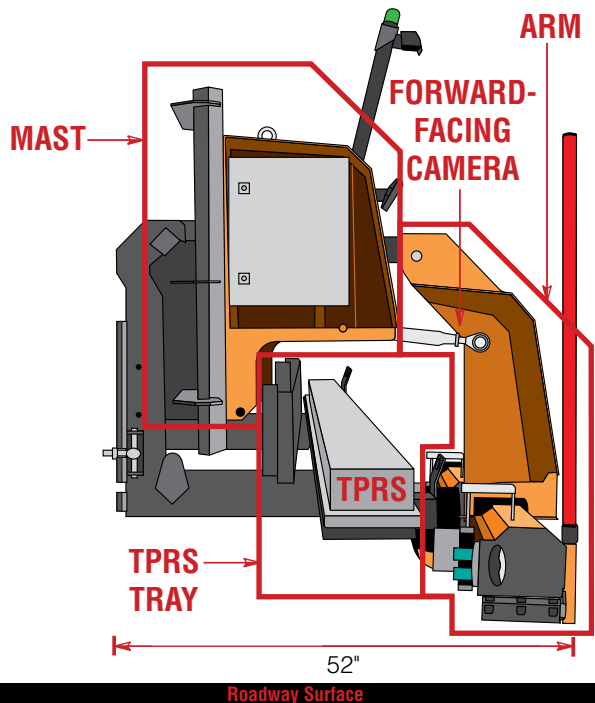
## OPERATIONAL MODE:

1. Forklift Support  
*30" Wide*
2. Position Lamps
3. RoadQuake® 2F TPRS
4. Indicator Lights
5. Forward-Facing Camera
6. Magnet Bar
7. Positioning / Alignment Rod



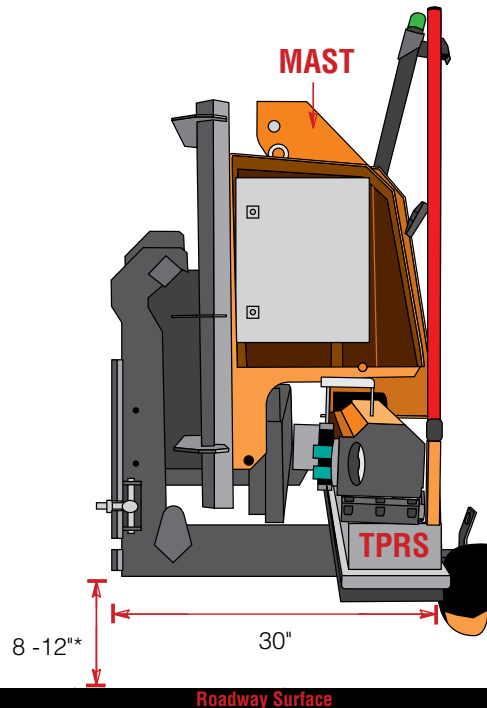
# RAPTOR® OPERATIONAL MODE

**SIDE VIEW, ARM EXTENDED:**



**SIDE VIEW, ARM RETRACTED:**

*\*Recommended ground clearance with full RAPTOR*



# RAPTOR® SPECIFICATIONS

## RAPTOR DESIGN:

RAPTOR is designed exclusively for the transport, deployment, realignment and retrieval, of RoadQuake Temporary Portable Rumble Strips. Do not attempt to use RAPTOR to carry any other objects.

## RAPTOR SPECIFICATIONS

Brand Name	RoadQuake RAPTOR
Category	Rumble Strip Handling Machine
Function	Transports, deploys, realigns, retrieves RoadQuake 2F TPRS
Capacity of TPRS	12 Each
Operating System	Electric / Self-Contained Hydraulic
Recommended Mounting Height from Road	8-12" (20-25 cm)

## VEHICLE REQUIREMENTS (Provided by user)

Front Axle Load Capacity	3,000 lbs. (1,360 kg)
Power	12 VDC / 140 peak Amp
Mounting	DIN Plate

## WEIGHTS

RAPTOR Weight (Empty)	1,530 lbs. (694 kg)
TPRS Individual Weight	105 lbs (48 kg)
Total Weight (TPRS & RAPTOR)	2,790 lbs. (1,266 kg)

## OTHER FEATURES

Lights	2 Each Aux. Headlights 4 Each Work Lights
Guide Markers	2 each 48" L (122 cm)
Cameras	1 Forward-Facing 1 Downward-Facing
Remote Control	1 Push-Button Remote

## ACCESSORIES

TPRS Spacing Measurement Device	Distance Measuring Equipment (DME not provided by PSS)
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# CRIB® CARRIERS

## ROADQUAKE® 2F CRIB® FEATURES:

CRIB is a fully integrated cargo carrier designed specifically for the safe transport, deployment, removal, storage, and safekeeping of RoadQuake® 2F TPRS.

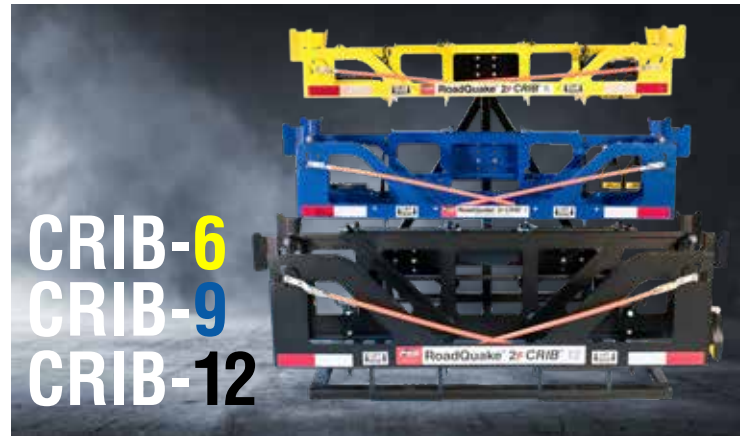
CRIB Carrier Sizes:

- » CRIB-6 holds six RQ 2F TPRS
- » New Size: CRIB-9 holds nine RQ 2F TPRS
- » CRIB-12 holds twelve RQ 2F TPRS

Each CRIB carries a multiple of three strips, enough for the deployment and retrieval of up to four, three-strip arrays.

## CRIB® BENEFITS:

- » Shortens workers' time in traffic to deploy and retrieve strips, compared to manual handling.
- » Reduces possible superficial stress or injury that could be caused by manual handling.
- » Deployment and removal of RQ 2F TPRS can be a one-person job.
- » CRIB mounts to exterior of vehicle. Strips do not consume space in vehicle.
- » Easier to place RQ 2F TPRS in alignment with deployment location.



# CRIB® SPECIFICATIONS

	CRIB-6	CRIB-9	CRIB-12
Dimensions (WxHxL)	19 5/8" x 15" x 74 1/4"	19 5/8" x 19 9/16" x 74 1/4"	19 5/8" x 24 5/16" x 74 1/4"
Material of Construction	Steel, Powder Coated Yellow	Steel, Powder Coated Blue	Steel, Powder Coated Black
TPRS Capacity	6	9	12
Weight (Empty)	92 lbs (41 kg)	111 lbs (50 kg)	133 lbs (60 kg)
TPRS Weight	630 lbs (286 kg)	945 lbs (429 kg)	1,260 lbs (572 kg)
Total Weight (TPRS & Carrier)	722 lbs (327 kg)	1,056 lbs (479 kg)	1,393 lbs (632 kg)
Mounting / Receiver	Class IV or V	Class V, or Custom by User	Custom by User
Pintle Mount	Included (2")	Included (2 1/2")	N/A
Quik-Detach	1 Each Included (Black)	1 Each Included (Blue)	2 Each Included (Black)
Roadquake® T-Handle	2 Each Included	2 Each Included	2 Each Included
T-Handle Holder	1 Each Included	1 Each Included	1 Each Included
Retractable Transport Straps	2 Each Included	2 Each Included	2 Each Included
Guide Markers	36" Included (91 cm)	36" Included (48" Optional) (122 cm)	48" Included (122 cm)
Conspicuity Tape	3 Sides Included	3 Sides Included	3 Sides Included
Literature Canister	1 Each Included	1 Each Included	1 Each Included
RoadQuake Best Practices	1 Each Included	1 Each Included	1 Each Included
Breakaway Pin Kit (1 TPRS)	1 Each Included	1 Each Included	1 Each Included

# CRIB® FEATURES

## NEW DESIGNS:

We recently redesigned and added new features to CRIB and CRIB XL Carriers. With new features comes new names. CRIB is now CRIB-6, CRIB XL is now CRIB-12. And we added another size: CRIB-9 Carrier, which holds nine RQ TPRS. Our new designs are available summer, 2020!

## NEW FEATURES:

1. **Redesigned Guide Fins:** The fins guide RQ TPRS in and out of CRIB for easier handling. We redesigned the fins so they are thicker and stronger. Fins can now support the weight of loaded, like-sized CRIBs, when stacked for more efficient storage:
  - » CRIB-6: stack a max. of four loaded CRIB-6.
  - » CRIB-9: stack a max. of three CRIB-9.
  - » CRIB-12: stack a max. of two CRIB-12.
2. **Design Integration:** We integrated several features into the new CRIB designs. Once optional, they are now standard on all new designs.
  - A. Guide Markers
  - B. T-Handle Holder
  - C. Quik-Detach Mounting System
  - D. Retractable Ratchet Straps

3. **Weight Reduction:** With design integration, we significantly reduced the weight of new CRIBs but retained the strength and integrity of CRIB. We reduced CRIB-6 by 39%, CRIB-12 by 34%.
4. **Literature Canister:** New to CRIB, our water-tight canister holds a print copy of our Best Practices Guide and a Breakaway Pin Connection Replacement Kit, which contains enough components to repair 1 RQ TPRS. We include guidebook and pin kit with each CRIB shipment.

On the next page, we use CRIB-6 to show our new design features. CRIB-9 and CRIB-12 also enjoy the same features.

*Patent Pending*

# CRIB-6 FRONT



# CRIB-6 BACK



# ROADQUAKE® 2F RETRIEVAL SYSTEM

## RETRIEVAL SYSTEM FEATURES:

Retrieval System pulls RoadQuake 2F Temporary Portable Rumble Strips (RQ TPRS) into a CRIB Carrier with little manual effort.

- » Features a powerful 4.1 HP, 12 V electric motor that pulls a 105 lb. RQ TPRS into CRIB in less than ten seconds.
- » Reduces workers' exposure to live traffic. Also reduces manual handling and exertion and possible injury.
- » Removal of RQ TPRS can be a one-person operation.
- » Attaches quickly to either end of CRIB for retrieval of strips from either driver or passenger side.
- » Power Pack Unit is a self-contained, charging electrical system. Charges from a 12-Volt automotive system. Maintains charge when plugged into running host vehicle. Power Pack Unit is weather-resistant.
- » For use with CRIB-6, CRIB-9, and CRIB-12.

RoadQuake® 2F Retrieval System is designed to only retrieve PSS RoadQuake 2F Temporary Portable Rumble Strips from the roadway.

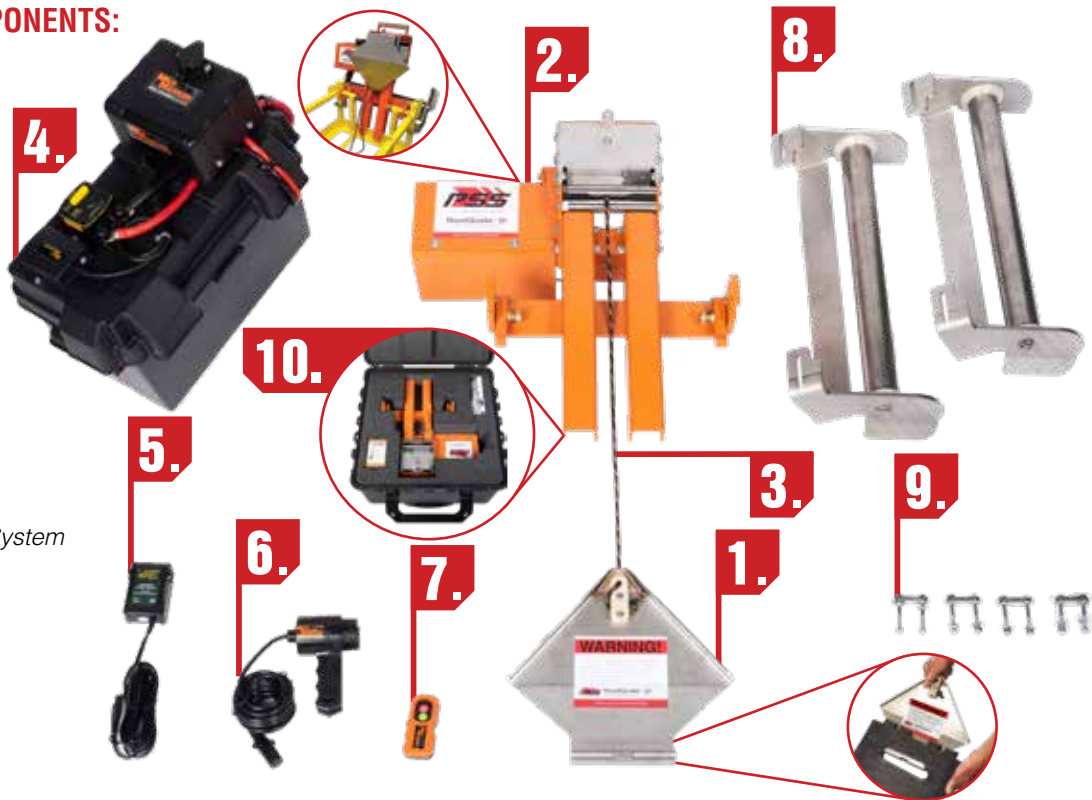
*Patent Pending*





## RETRIEVAL SYSTEM COMPONENTS:

1. Retrieval Hook
2. Retrieval Winch
3. Retrieval Rope  
*30 Feet*
4. Power Pack Unit
5. Power Pack Charger
6. Back-up Wired Controller
7. Wireless Remote Controller
8. Roller Bracket Assembly  
*Two Each*
9. CRIB Roller Clamps  
*Four Each*
10. Hard-Shell Plastic Case  
*Not Included with Retrieval System*



# FUNCTIONS OF RETRIEVAL SYSTEM

## RETRIEVAL INSTRUCTIONS:

1. Mount Retrieval System to CRIB® Cargo Carrier. Verify the Retrieval System is fully engaged.
2. With Power Pack stored safely in the truck, connect the power.
3. Always use caution when working in and around live traffic. Pull Retrieval Hook out to the first rumble strip in the array.
4. Attach the Retrieval Hook to the handle of the rumble strip. Attach the hook underneath the rumble strip to the closest handle.



5. Press the “IN” button on the Remote to return the rumble strip to CRIB Cargo Carrier.
6. Retrieval System features a powerful 4.1 HP, 12 V electric motor that can pull a 105 lb. RoadQuake 2F TPRS into CRIB in less than 10 seconds! Repeat sequence until all RoadQuake 2F TPRS have been removed from the roadway.

7. Remove Hook from rumble strip in CRIB to repeat the process.
8. When all rumble strips have been returned to CRIB, and the job is complete, turn off Power Pack, disconnect from motor, and place Retrieval System in the truck for safe storage and transport.



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We are a proud member of:



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