



## AUTO-X SIMULATOR



## OPERATIONS MANUAL

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## A Word from The Manufacturer

The FireVent Auto-X Simulator was created to help teach students and firefighters the basics of extrication tool use. It is intended as an entry-level experience and allows the user to perform hands-on tasks with various tools. Because of its design, the student can operate in a controlled environment with predictable results. As firefighters with decades of experience, we will be the first to acknowledge that this is not an actual car and that there are countless variables that cannot be simulated while training with the prop. The intent was to allow students and firefighters to gain confidence in tool operation prior to training on cars or responding to calls. With this in mind, we trust that the Auto-X Simulator will be utilized as one tool from a box of many options to help further the knowledge and training of today's emergency responders.



## A Word About Safety

Always be sure to maintain a safe distance of approximately 10 feet from the Auto-X Simulator, while extrication tools are being used.

Never place an individual in the seat of the Auto-X Simulator, while the extrication tools are being used, always use a training manikin.

As we have all heard, “Safety does not happen by accident.” Our job is inherently dangerous and training for that job can come with many of the same hazards. Whether using a bailout window, vent prop, or auto simulator, FireVent encourages the use of full PPE, all the time. We should “train as we do” and never compromise our own well-being or that of our fellow firefighters. Training with full PPE allows participants to feel exactly what they will be feeling when the situation is real. Most importantly, PPE worn by all participants will provide protection from unforeseen events or incidents that could cause harm. All FireVent products are designed with safety in mind and are thoroughly tested to ensure the highest level of safety for the participants. Even so, no amount of research or testing can reveal every hazard, so please – WEAR YOUR PPE!



## Care and Use

The FireVent Auto-X Simulator has been designed and built to provide many years of service. Basic care and maintenance will ensure that the Auto-X Simulator looks good and functions properly for years to come.

General cleaning should be performed with mild soap and water. Wash the surfaces with soap and a soft brush or cloth and rinse and dry as you would a personal vehicle. The powder-coated finish is resistant to most chemicals but in the event it is exposed to harsh chemicals or hydraulic fluid, FireVent recommends prompt cleaning to avoid permanent damage.

The trailer axle and wheels/tires should be inspected for wear and/or damage each time the Auto-X Simulator is transported. Proper lubrication of the components should be performed by a qualified mechanic and tires should be replaced when worn or damaged. Cleaning these components is the same as the rest of the unit.

Storage of the Auto-X Simulator should be indoors if possible. If stored outside, wheels should be chocked to prevent accidental movement. FireVent also recommends the use of an all-weather cover to minimize exposure to the elements if storage inside is not possible.



## Transporting the Auto-X Simulator

The FireVent Auto-X Simulator can be easily transported using the optional tow package. Since it is not a titled vehicle, most states do not require registration or licensing. FireVent encourages each owner to consult with their state DMV to ensure compliance with state and local laws. Scan the QR code here to access videos on transporting the Auto-X Simulator.



- Remove steel pipe from the door and securely tighten bolts securely.
- Secure the door with a new piece of box steel and the bolt/spring/nut.
- Secure the base plate to the top of the door and tighten bolts securely.
- Remove box steel from the strut tower, A-pillar, and B-pillar. Tighten bolts securely.
- Remove box steel from the dash rollup cut and crush areas. Tighten bolts securely. Lower dash to the bottom position.
- Connect the caster wheels to both ends of prop and lower them to touch the ground.
- Loosen the four bolts securing the legs at each end.
- Using casters, raise the prop until the legs are clear and move them to the left side of the prop.
- Unpin, rotate 90° and re-pin the storage arms for leg storage.
- Place the legs on the storage arms and secure with the four pins.
- Remove the hitch pin holding the hitch to the axle. Attach the trailer hitch to the front of the unit with the hitch pin.
- Roll the axle to the rear of the unit. Using casters, raise the unit enough to allow the axle to be placed. Once aligned, lower the unit onto the axle. Place the hitch pin and tighten the four bolts securely.
- Raise the rear casters until above the axle.
- Using casters, raise the front until the hitch is above the ball of the tow vehicle. Align the unit with the tow vehicle and lower the hitch onto the ball. Latch the hitch securely, replace the pin, and attach the hitch chain.
- Raise the front casters until they are off the ground. Unpin the jack, rotate 90° clockwise, then re-pin for storage.
- The unit is ready for transport. Obey local laws regarding trailer towing.

## Setup After Transport

Setup of the Auto-X is quick and easy. It may be done with one person but two or more will speed the process. Scan the QR code here to access videos on setup.



- Upon arrival at the destination, locate the simulator in a clear, flat area.
- Leave the unit attached to the tow vehicle and unpin the front casters. Rotate the casters 90° counterclockwise and replace the pin. Lower until the casters touch the ground.
- Remove the pin from the trailer latch and release the latch. Disconnect the hitch chain from the tow vehicle. Using the casters, raise the unit to lift the hitch upward until clear of the vehicle.
- Using the ratchet, loosen the four bolts holding the axle. Remove the hitch pin.
- Using casters, raise the rear of the unit to free the axle and roll it clear.
- Remove the hitch pin from the trailer attachment and place it into the axle receiver. Install the hitch pin to connect them. The axle can now be easily moved around.
- If the simulator is to be moved a great distance, it must be lowered for stability during movement. One person can easily move it.
- Once at the desired location, remove the four pins holding the legs. Slide the legs under the front and rear of the unit. Remove the pins holding the leg supports and rotate them 90° under the unit. Replace the leg support pins and place the additional pins in the holes for storage.
- Loosen the four bolts at the front of the unit where the legs mount. Raise the front of the unit about halfway up. Raise the rear of the unit high enough to place the rear legs underneath. Return to the front and finish raising the unit until high enough to place the front legs.
- Slowly lower the unit onto the front legs, only lowering about halfway. Repeat at the rear of the unit, lowering all the way down. Return to the front and lower all the way down. Secure the four bolts at each end with the ratchet and socket.
- At both ends, raise the casters slightly and remove the pins holding them in place. Remove the casters and place away from the area during extrication operations.
- The unit is now stable and ready.

## FULL OPERATIONAL VIDEO

Please scan the QR code for a full operational video



The main dash bolt nut should not loosen or move, however occasionally check to be sure that it is properly in place with full compression on the yellow spring.

Before each use, check to be sure the tension bolt is touching the dash arm and the jamb nut is tight.



## **Primary Door Simulation**

The Primary Door is used to simulate popping open a door to gain access to patients inside a vehicle. Box steel is bolted into the main frame to create a “latched door” with the bolt functioning as a “Nader pin”. Hydraulic spreaders are used to spread the box steel away from the frame until the bolt is ripped through which allows the door to open freely. A tight gap requires that hand tools be used to gain access for the tips of the hydraulic tool.



### ***Primary door preparation***

- Open the door and slide a new piece of box steel in from the bottom.
- Close the door completely using caution not to pinch fingers.
- Place the bolt through the hole in the box steel from left to right.
- Place the tension spring and nut on the right side to secure the bolt with the ratchet and socket.
- The nut should seat on the bolt and remain flush.



- The primary door is now ready for forcible entry.
- FireVent recommends hand tools to gain a purchase for hydraulic tools.
- Hydraulic tools should be used near the bolt for the most effective experience.
- Spread until the bolt pops through both sides of the box steel and door can open – DO NOT OVERSPREAD!
- After forcible entry is performed, the door will swing free on the compound hinge. Swing the door open and pull outward to allow hinge to fully open.
- Cutting tools will be required to remove the bent box steel from the door.
- Save fall-off pieces for use in other parts of the prop.

## **Door Hinge Simulation**

Once the Primary Door is opened, the internal “hinges” can be accessed. These are the 1” (2.5 cm) round steel pipes that stick out of the front of the door. The door must be pulled outward to allow for full opening. A cutting tool (hydraulic cutters, reciprocating saw) can be used to cut these to simulate door removal. Once cut, the door will swing out of the way to allow access to the door frame and dash rollup area.



## ***Door hinge preparation***

- Place new pipe in the channels from the rear of the door.
- With the door closed, slide the pipes forward until they reach the stop tabs.
- Secure the pipes in place with the T-bolts (finger tight).
- Once the door is open, use hydraulic cutters to cut the top and bottom pipes.
- FireVent recommends cutting in the middle of the pipes to allow for tool movement during the cutting process.
- Open the door approximately 90 degrees and loosen the T-bolts to slide the pipes back into door to reduce sharp edge hazard.
- The door will now fully open 180 degrees and remain clear for dash rollup access.
- Upon reset, slide existing pipe forward until it reaches the stop tabs.
- If the pipe slides forward and is not in contact with the T-bolt, replace the pipe with a new piece and secure with the T-bolts.

## **Strut Tower Simulation**

The front of the prop has an attachment point for a piece of box steel. This can be used to simulate the cutting of a strut tower or pinching a fender to gain access to hinges. It can also be used for general practice as an easily accessible and open area to use a variety of rescue tools. New firefighters with limited experience should utilize this area for practice to gain confidence in the use of various power tools.



## ***Strut tower preparation***

Attach a clean-cut piece of box steel into the strut tower opening using at least a 6-inch (15cm) minimum size piece. Box steel that has been cut with hydraulic cutters will be deformed and not slide into the opening. Secure the box steel tightly with the bolt using a ratchet and socket. Replace the steel when it becomes too short to safely operate tools without damaging the Auto-X Simulator.

## **A-and B-Pillar Simulation**

Rectangular box steel can be placed into the pillars to allow for cutting practice to simulate the cuts needed to remove the top of a vehicle. A variety of tools can be used including hydraulic cutters, circular saws, and reciprocating saws. Place the box steel into the holder and secure with the t-bolts. After cutting, loosen the bolts and remove the material. Fall-off pieces from the pillars can be reused in the dash rollup area.

### ***A-Pillar preparation***

- Loosen the t-bolt and slide a new piece of box steel in from the top. Secure tightly.
- Hydraulic or saw cutting can be practiced. Hydraulic cutters should approach from the side and not the top due to deformity.
- After cutting, loosen the t-bolt and slide the top piece upward to allow clearance for the lower piece to be removed.
- Lower the remaining piece and secure the t-bolt tightly.
- If the box steel is too short to reach the t-bolt, replace with a new piece.



### ***B-Pillar preparation***

- Loosen the two t-bolts and slide a new piece of box steel in from the top.
- Securely tighten both t-bolts with fingers.
- FireVent recommends cutting here with saw tools only. Hydraulic cutting deforms the box steel and makes removal difficult.
- After cutting, loosen the two t-bolts and slide the top piece upward to allow clearance for the lower piece to be removed.
- Slide the remaining piece down and secure the t-bolts.
- If the box steel is too short to reach the upper retainer bolt, replace it with a new piece and secure tightly.

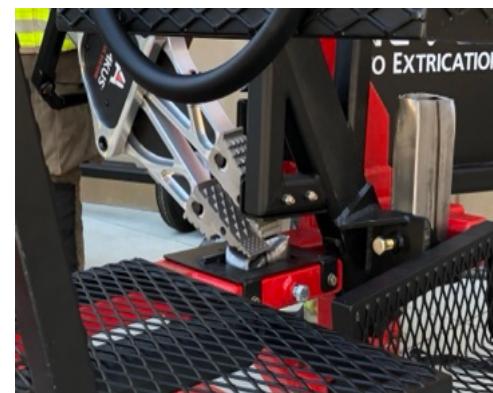


## **Dash Rollup Simulation**

The dash rollup feature should be practiced after the door has been opened and the hinges have been cut. This will allow full access to the door frame and dash without interference. The simulator was designed to be able to place a rescue manakin or person in the seat during training to add realism. The seat can be adjusted up/down and forward/backward to accommodate various sizes of people and simulate entrapment. If desired, participants can initiate and practice patient care (spinal precautions, airway control etc.) throughout the extrication evolution.

For the rollup process, the L-shaped “Rescue Plate” / “Rocker Panel” should be set in the doorframe before utilizing a ram. A cutting tool should be used to cut the box steel at the base of the doorframe to simulate a relief cut. Once complete, place the base of the ram into position in the Rescue Plate and the extending tip of the ram into one of the two reinforced pockets of the dash. The ram can be used to push the dash up and away from the victim to facilitate extrication. Always lift or roll the dash in a SLOW AND CONTROLLED manner. It is recommended for skill practice that while the dash is being lifted that another student “crib” where the relief cut was made, directly on top of the cut box steel and under the angle iron wear plate.

As an alternative, the Modified Dash Rollup can be performed by placing the tips of the spreaders directly on top “relief cut” and under the wear plate portion at the base of the dash to lift it up SLOW AND CONTROLLED. The dual heavy-duty stabilizer rams ensure that the dash cannot fall back down in an uncontrolled manner.



## ***Dash Preparation***

- Loosen the retainer bolt and place a piece of box steel into the base of the door frame (see chart on page 13 for min/max sizes). Tighten the retainer bolt with the ratchet and socket.
- Place a piece of box steel into the crush zone of the dash (see chart on page 13 for min/max sizes). Tighten the t-bolt by hand.
- Place the rocker panel recue plate into the doorframe if using a ram.
- The dash is ready for extrication practice.
- Use the Rescue / Rocker Panel Plate during ram use only.
- Use the reinforced area if using spreaders to lift the dash.
- Once the dash has lifted, stop at the yellow tab – DO NOT OVERLIFT.
- When complete, let the dash lower back down.
- Remove the crush zone piece of steel (may require pliers).
- Loosen the retainer bolt and remove the rocker panel relief cut piece (may require pliers)
- Reset with new pieces as outlined above





## **Reset Kits**

Specifications for the consumable parts are provided on the following page to help the user source the correct products. FireVent recommends using our Reset Kits to ensure proper operation of the simulator. The use of materials outside of the specifications can endanger the user and cause damage to the equipment. FireVent has 30-, 50- reset kits available for quick shipment. Contact us at 1-775-230-9953 or [info@firevent.us](mailto:info@firevent.us) for current pricing on Reset Kits. FireVent encourages all users to recycle spent materials.

### **Reset Kits**

<b><i>Items</i></b>	<b><i>Reset 30</i></b>	<b><i>Reset 50</i></b>
Box Steel	30	50
1" Pipe (48" long)	6	10
Bolt/Nut/Spring	✓	✓

## Material Specifications

### Specifications

Box steel pieces measure 2" x 4" x 22.5" (5.1 x 10.2 x 57.2 cm) with a thickness of .083" (2.1 mm). There is a 5/8" (16mm) hole centered along the long axis on the 4" (10.2 cm) side.

Round steel pieces measure 1" x 48" (2.5 x 122 cm) with a thickness of 1/8" (3.2 mm)

### Box Steel Size Recommendations

Part	Min. Length	Max. Length	Notes
Door	22.5" (57.2 cm)	22.5" (57.2cm)	New, full pieces only
A-Pillar	12" (30.5 cm)	22.5" (57.2cm)	New or partial pieces
B-Pillar	12" (30.5 cm)	22.5" (57.2cm)	New or partial pieces
Rollup Cut	4" (10.2 cm)	9" (22.9 cm)	Clean cut on both sides
Rollup Crush	4" (10.2 cm)	22.5" (57.2cm)	Clean cut on at least one side
Strut Tower	6" (15.2 cm)	22.5" (57.2cm)	Clean cut on at least one side

FireVent recommends reusing clean-cut steel from the door and pillars for the dash rollup pieces. Best results are achieved using stock that has been cut cleanly with a saw instead of with hydraulic cutters.

### Round Steel Size Recommendations

Round steel is only used in the door hinge area. Full pieces measure 48" (122 cm) and should allow several cuts before needing replacement. When the length is reduced to around 10" (25 cm) and the t-bolt does not contact the steel, replacement is necessary.

## **Hardware**

The door bolt measures 5/8"-11 x 7" and is made from Grade 8 steel. It is finished with a die spring and a 5/8"-11 Grade 8 nut. All other large bolts are 5/8"-11 in various lengths and if replacement is required, new bolts should meet exact specifications. Smaller bolts are used to attach the wear plates and they measure 3/8"-16 x 1" Grade 8. Although FireVent has never seen a hardware failure during testing and demonstration, regular visual inspection of these components for damage is recommended. Any damaged components should be replaced before resuming use of the Auto-X Simulator. FireVent also recommends periodic replacement of these components. All reset kits include these parts as a reminder. Contact FireVent with any questions regarding replacement parts.