

Family Owned and Operated since 1890!

Industry and Sutphen Changes



Talk About Change





Talk About Change – Where We Started





Talk About Change – What We Dreamed About





Talk About Change – Where We Are Today





Industry and Sutphen Changes Outline

- Cover NFPA Updates
- Cummins 2026 Engine Updates
- Interior Cab Updates
- Winch Receiver Ratings
- Hilliard Operations Improvements
- East Operations Improvements
- Sutphen Dublin Facility Improvements
- Sutphen Pumper Improvements
- Sutphen Aerial Improvements



NFPA Changed from 1901 to 1900

- Now titled "NFPA 1900 Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances 2024", subtitle "Includes NFPA 414|NFPA 1901|NFPA 1906|NFPA 1917".
- There have been significant changes that impact the way we sell, design, and build trucks. Sections (§) applicable to automotive fire apparatus (our trucks) are indicated in §1.3(2).
- For our concern, this standard applies to vehicles that are **contracted for on or after January 1, 2024**. The following slides will talk about significant changes that impact our products and our business.



Electronic Stability Control (ESC)

- Electronic Stability Control (ESC) will be required on all vehicles "for which it is commercially available" (NFPA 1900 §7.14.1).
 - **7.14.1.1** The apparatus shall be equipped with a stability control system in any configuration for which it is commercially available.
 - 7.14.1.2 The stability control system shall have, at a minimum, a steering wheel
 position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual
 wheel brake controls.
 - 7.14.2 Apparatus completed in two or more stages shall not exceed the incomplete vehicle manufacturer's maximum allowable vertical center of gravity.
- The intent of the requirement in 7.14.1 is to require ESC on all apparatus where the technology is currently available. Configurations where the technology might not be commercially available include the following:
 - (1) Apparatus with a driving front axle.
 - (2) TDA apparatus
 - (3) Apparatus with rear axle steering



Electronic Stability Control (ESC) - continued

- 7.14.3 Rollover Stability.
- **7.14.3.1** Structural fire apparatus not equipped with a stability control system and all wildland fire apparatus shall meet either of the following:
 - (1)* The apparatus shall remain stable in both directions in accordance with Table 7.14.3.1 when tested on a tilt table in accordance with SAE J2180, A Tilt Table Procedure for Measuring the Static Rollover Threshold for Heavy Trucks.
 - (2) The calculated or measured vertical center of gravity (VCG) divided by the rear axle track width shall not exceed the applicable criterion in Table 7.14.3.1.
- **Table 7.14.3.1** Rollover Stability Requirements

•	Vehicle	Tilt Criteria	VCG/Track
•	Wildland fire apparatus ≤33,000 lbs. (15,000 kg) GVWR	30	75%
•	Wildland fire apparatus >33,000 lbs. (15,000 kg) GVWR	27	80%
•	Structural fire apparatus not equipped with a stability control system	n 26.5	80%

- 7.14.3.2 Certification shall be by one of the following methods:
 - (1) Performing a tilt-table test on the completed apparatus
 - (2) Calculating the point at which the apparatus will tip based on centers of gravity, suspension geometry, suspension compliance, and tire compliance
 - (3) Comparing the apparatus design to a previously certified substantially similar apparatus
 - (4) Demonstrating that the calculated or measured center of gravity (CG) divided by the rear axle track width does not exceed the value in Table 7.14.3.1



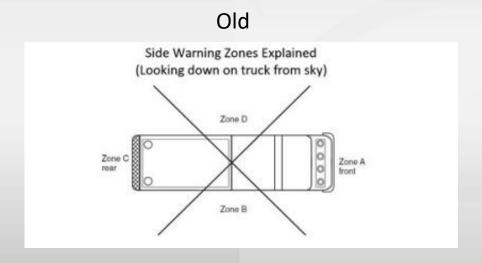
Air Intake Location

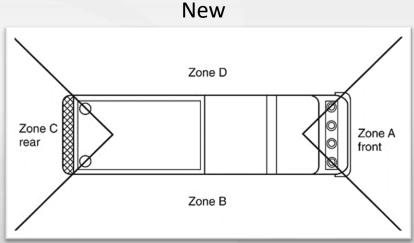
- Manufacturers will be required to state the height of the lowest portion of the air intake system that is not sealed (open to water intrusion) in the operator manual (NFPA 1900 §7.21.2.9*)
 - **7.21.2.9** * The operator manual shall address the water fording capabilities of the vehicle.
 - A.7.21.2.9 The ability of an apparatus to ford water is dependent on a number of factors. One of these is the height of the engine air intake opening. This height can help the purchaser understand part of the apparatus's ability to operate in high water. Even this value must be considered carefully because the speed of travel as well as physical features around the opening will affect the fording ability. Other considerations include vents on axle differentials and engine crankcases as well as electrical equipment. If the purchaser intends to operate in high water, it is recommended that they work with their apparatus manufacturer to ensure that other components that would be affected by water will be addressed, and that the apparatus can be manufactured to the desired water fording depth.



Warning Zone Depiction

• Note that the depiction of the warning zones has been updated to a more accurate depiction.







Warning Devices

- Upper-level optical warning device now allowed above 8' (2.4m). Restriction was eliminated (NFPA 1901 §13.8.14.2.1).
 - **13.8.14.2.1** The upper-level optical warning devices shall be mounted as high as practical, but not over 8 ft (2.4 m), at the optical center.
- DVI was not added to NFPA as a requirement nor was any changes made to flash patterns or dimmable lightings.
- Current Standards
 - **10.7.8.4** Any method used in changing a signaling mode shall comply with the requirements of this chapter.
 - **10.7.10** * The optical warning devices shall not impair the effectiveness of lighting devices required under 49 CFR 571, FMVSS 108 including headlights, turn signals, clearance lights, and brake lights
 - 10.7.12.1 Flash Rate. The flash rate of any optical source shall be between 60 and 240 flashes per minute.
 - 10.7.12.2 Steady Lights. The optical energy provided by nonflashing optical sources, or the steady burning part of an optical flash characteristic, shall not be included in the calculations of the zone's total optical power.
 - 10.7.13.1.1 The optical energy provided by green optical sources shall not be included in the calculations of the zone's total optical power or meeting the requirements for any required lights.
 - **10.7.13.2** All colors shall be as specified in SAE J578, *Chromaticity Requirements of Ground Vehicle Lamps and Lighting Equipment*, for red, blue, yellow, green, or white.
 - 10.7.15.2.2 * The upper-level optical warning devices shall consist of a single optical warning device providing 360 degrees of conspicuity or a combination of optical devices creating 360 degrees of conspicuity.



Master Disconnect

- Master disconnect removed (was NFPA 1901 §13.4.6). NFPA 1900 now calls for a Major load disconnect switch with no further details on what load this should disconnect.
 - 13.4.6 * One of the following master disconnect switches shall be provided:
 - (1) A master body disconnect switch that disconnects all electrical loads not provided by the chassis manufacturer
 - (2) A master load disconnect switch that disconnects all electrical loads on the apparatus except the starter



Master Disconnect - continued

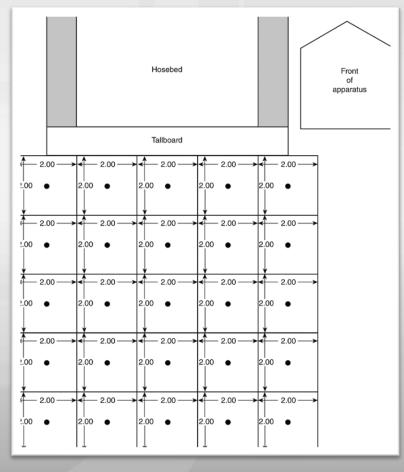
- 11.3.6.1 * The following instrumentation and controls shall be mounted in the driving compartment and shall be identified and visible to the driver while seated:
 - (1) Speedometer
 - (2) Tachometer
 - (3) Odometer
 - (4) Oil-pressure indicator or gauge
 - (5) Coolant temperature indicator or gauge
 - (6) Automatic transmission temperature indicator or gauge, if applicable
 - (7) Voltmeter
 - (8) Hazard indicator light (see Section 10.10)
 - (9) Air-pressure gauge(s), if applicable
 - (10) Turn signal control and indicator lights
 - (11) Headlight/DOT light switch
 - (12) High-beam headlight switch and indicator
 - (13) Fuel level gauge(s)
 - (14) Master ignition switch (if a key is provided, it shall be unable to be removed from the driving compartment interior)
 - (15) Heater/defroster controls
 - (16) Warning lights and siren switches
 - (17) Major load disconnect switch
 - (18) Windshield wipers and windshield washer control
 - (19) PTO-engaged indicator, if applicable
 - (20) Pump engagement controls, if applicable



Rear Work Light

- Size of work area behind the vehicle reduced (NFPA 1900 §10.9.1.1.1).
 - 10.9.1.1.1 The work area immediately behind the vehicle shall be illuminated to an average level of at least 3 fc (30 lx), measured at the center of 25 equally spaced 2 ft 2 divisions within a 10 ft \times 10 ft (3 m \times 3 m) grid that is square to the rear of the vehicle, as shown in Figure 10.9.1.1.1.

a. Figure 10.9.1.1.1 Measurement Grid for Lighting.





Backup Camera

- Rear view camera now required to be installed by the OEM (NFPA 1900 §10.11.2).
 - 10.11.2 A rear-view visibility system shall be provided that, upon placing the vehicle transmission into reverse, allows the vehicle operator to visibly see an area no less than 10 ft \times 20 ft (3 m \times 6 m) directly behind the vehicle.
- It will have to be installed before the vehicle goes into service. If the apparatus leaves our facility without a rear-view camera, it would be non NFPA compliant.
- Sutphen is exploring other camera manufactures to strengthen our camera offerings. More information to follow at the meeting, and you will have the ability to talk with a few new vendors at the trade show.



Seating Width Requirement

- Occupant seat width requirements changed (NFPA 1900 §11.1.9).
 - **11.1.9.1** Seating Position Width.
 - **11.1.9.1.1** Each designated **primary seating** position shall have a minimum clear width of 20.8 in. (529 mm) at the hip level and 27.6 in. (701 mm) at the shoulder level.
 - 11.1.9.1.2 Each designated secondary seating position shall have a minimum clear width of 20 in. (508 mm) at the hip level and 22 in. (559 mm) at the shoulder level.
 - 11.1.9.1.3 Width at hip level shall be measured at the seating H-point.
 - **11.1.9.1.4** Width at shoulder level shall be measured at the height of line 2 as defined in the seat belt length determination procedure in 11.1.3.2.
 - **11.1.9.1.5** Width shall be measured with the seat adjusted to the center of its horizontal and vertical travel adjustment.
 - **11.1.9.1.6** The center of any clear width shall not be offset from the center of the seat cushion by more than 3.0 in. (76 mm).
 - **11.1.9.1.7** Overlap.
 - **11.1.9.1.7.1** The clear width of any **primary seating** position shall not overlap the clear width of any other primary seating position.
 - **11.1.9.1.7.2** The clear width of any **primary seating** position shall be permitted to overlap the clear width of a secondary seating position.
 - **11.1.9.1.8** Every seating position shall provide a minimum clear width of 22 in. (560 mm) at the shoulder level without overlap.
 - **11.1.9.2** Seat Cushion. Seat cushions shall be a minimum of 18 in. (460 mm) in width and 15 in. (380 mm) from the front of the cushion to the face of the seat back.
 - **11.1.9.3** Back Cushion. A back cushion that extends from the face of the seat vertically at least 18 in. (460 mm) and that is a minimum of 18 in. (460 mm) wide at the base shall be provided.



Rear Chevrons

- Alternate rear facing chevron colors allowed (NFPA 1900 §12.8.3.2.1 (2)).
 - 12.8.3.2.1 Each stripe in the chevron shall conform to one of the following:
 - (1) A single color alternating between red and either yellow, fluorescent yellow, or fluorescent yellow-green
 - (2) A single color alternating between different and high-contrasting colors







Hose Reel

- Any hose reel with more than 100 feet of hose must include a powered rewind function.
 - 12.9.8.3 Where the reel
 has a capacity of over
 100 ft (30 m) of hose,
 the reel shall have
 power rewind
 capability.





Third Party Testing

- Allowance for remote 3rd party certification (NFPA 1900 §13.13.1.1.5).
 - **13.13.1.1.5** The independent third-party organization shall witness all required tests by an in-person representative(s) at the test site or by use of verifiable automated data collection and image recording equipment.





Load Chart

- Requirements for load chart visible to aerial operator (NFPA 1900 §20.30.3.2).
 - **20.30.3.2** A load chart shall be visible to the primary operator and to the platform operator.
 - (1) Rated capacity through the range of motion of the device
 - (2) Rated vertical height
 - (3) Rated horizontal reach
 - (4) Rated water Flow (if applicable)
 - (5)* Rated wind speed
 - A.20.30.3.2(5)
 - The manufacturer should state the wind speed capability with the aerial device at its rated vertical height. The wind pressure load should be evenly distributed from the base to the tip.
 - The load chart information can be provided in printed or electronic display screen format. If the primary load chart is electronic, a readily accessible printed form should be supplied



Aerial Stabilizers

- Ground contact unit pressure from aerial stabilizers not to exceed 100 psi (NFPA 1900 §20.29.5.2).
 - 20.29.5.2 The ground contact area for each stabilizer shall be such that a unit pressure of not greater than 100 psi (675 kPa) will be exerted over the ground contact area when the apparatus is loaded to its maximum in-service weight and the aerial device is carrying its rated capacity in every position permitted by the manufacturer.
- Ground contact force from aerial stabilizers not to exceed 65,000 pounds (NFPA 1900 §20.29.5.4).
 - 20.29.5.4 * The maximum force on any stabilizer shall not exceed 65,000 lbs. (29,484 kg) when the apparatus is loaded to its maximum in-service weight and the aerial device is carrying its rated capacity in every position permitted by the manufacturer.



Aerial Stabilizers

- What does this mean for Sutphen?
- Integrated Jack Pads design will be changing for the SPH.
- The SPH standard Jack Foot will grow by approx. 1" to accommodate the new pressures per NFPA. This is still under engineering development currently.
- This will eliminate the need for a secondary body style to accommodate the larger jack feet we have today with integrated jack pad option.
- This will get Dublin back to a standard SPH setup that all of our customers have come to know and love.
- While not an active project; evaluation for all other aerial stabilizers to incorporate integrated jack pads will now be a possibility.



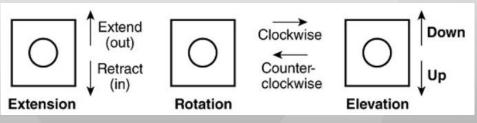
Yoke/Bucket Anchor Points

- New requirements for 1,800 lbs. testing of anchor points.
- 20.15.4.5 * Anchorage points shall remain attached to the aerial structure after applying a force of 1800 lbs. (816 kg) perpendicular to the mounting surface.
- **A.20.15.4.5** The test outlined in 20.15.4.5 should not imply that the load capacity or stability of the aerial device is meant to meet or comply with the anchor test load requirements.



Platform Controls

- Previous standards required a specific direction for the aerial controls to avoid confusion. The Center control level was to be pushed forward to rotate the turntable clockwise and pulled back for counterclockwise.
- A provision in NFPA 1900 will now allow the center level to move in the direction of travel. Meaning left or right.
- 20.25.7.2 If the rotation control has a forward/backward orientation or an up/down orientation, the turntable shall rotate clockwise when the rotation control is pushed up or forward (i.e., away from the operator), as shown in Figure 20.25.7.2.





Other Notable References

- Vehicle configuration and equipment required to be provided significantly modified. Notably equipment NOT required to be supplied with new vehicle (NFPA 1900 §8.5 through §8.20, and tables A8.4 (a), (b), and (c).
- References to IC engine, which is not defined in the definitions section.
 IC=internal combustion engine. In this context refers to diesel and gasoline engines. This clarification was added to address requirements for electric driven vehicles that will differ substantially from internal combustion engines.
- Clean cab features are not required in the new standard, but guidance is provided in the annex for those wishing to adopt clean cab procedures.



Other Notable References Continued

- Cooling system drain valves removed (was NFPA 1901 §12.2.2).
 - 12.2.2.1 Readily accessible drain valves shall be installed at the lowest point of the cooling system and at such other points as are necessary to permit complete removal of the coolant from the system.
- Lubrication label requirements simplified (NFPA 1900 §9.2.3).
 - 9.2.3 Lubrication System.
 - A permanent label in the driving compartment shall specify the quantity and type of the following applicable fluids used in the vehicle and the following tire information:
 - (1) Engine oil
 - (2) Engine coolant
 - (3) Chassis transmission fluid
 - (4) Pump transmission lubrication fluid
 - (5)* Front tire cold pressure
 - (6)* Rear tire cold pressure
 - (7) Maximum tire speed ratings



Summary

- ESC Will Be Required Except For TDA
- Location Of Air Intake Will Now Ne Noted On The Chassis
- Warning Zone Image Will Be Updated
- DVI Lighting Was Not Addressed
- Master Disconnect Not Required
- Rear Work Light Area Behind The Vehicle Reduced
- Backup Camera Now Required To Be Installed By OEM or with signoff letter
- Seat Spacing In Cab Will Be Updated
- Alternate Colors For Rear Chevron Colors Allowed Without Exception Letter
- Allowance For Remote 3rd Party Testing
- An Aerial Load Chart Now Includes Wind Speed
- Aerial Stabilizer SPH And Other Aerial Offerings Will Be Addressed

We will work towards updating SQS2 with the necessary changes to stay compliant with the new NFPA 1900 updates.



Cummins Engine Milestones

- Sutphen will be ordering the L9, X12, and X15 until middle of 2025 to fill current orders.
- L9, X12, and current X15 will be sunsetting at the end of 2025.
- X10 MHD, X10 HHD and X15 Next Gen will start production January 2026
- L9, X12, and X15 engines can be installed until March of 2027 as EPA allows up to 3 months past current emission standards to become compliant.
- First Targeted Aerial with X10 HS-7951 City of Elyria (SPH – Mid 2026 completion)
- First Targeted Pumpers with X10 HS-7967-69 City of Melbourne (PRG2 – Early 2027 completion)



Cummins X10 Scope

X10 has several fuel ratings

- HHD 1650 /b/ft offering will require a 4000 trans and TM13 Aftertreatment
- MHD 1250 lbs./ft offering are paired with a 3000 trans and TM10 Aftertreatment

<u>Integration</u>

12 and 24V Compatible

Transmissions In Scope: Allison 3000\4000\B500\B500R, ZF Powerline 8AP\1720 Eco Life 2,

Endurant HD\HDV, and Manuals Engine Weight (Dry): 780 +/- 25 kg

Performance Targets

Idle Speed: 600 - 800 rpm

Heat Rejection Targets: See Slide 42

DEF Consumption Targets:

- 6% for medium duty applications
- 7% for heavy duty applications

Ratings Plan:

X10	Horsepower	Torque (ft lb)	Aftertreatment Pairing			
Productivity Series	320 – 450 @ 2100 rpm	1000 – 1250	TM10			
Performance Series	350 – 450 @ 1800 rpm	1350 – 1650	TM13			

^{*}Transit Bus Aftertreatment System is TBD. Targeting 350/1150 @ 1800 rpm rated speed



Cummins X10 HHD Spec

Heavy Heavy Duty Certified TM13 Aftertreatment System Idle Speed: 600-800 rpm

No Load Governed Speed:2000

ID	Advertised Power @1800 RPM	Torque Peak @1000 RPM	Restricted	Truck	Refuse	Vocational	RV/Coach	Emergency	Transit
L450HHT	450 BHP 336 kW	1650 ft-lb 2237 N-m	Y	X		X	Х	×	
L450HLT	450 BHP 336 kW	1450 ft-lb 1966 N-m	Υ	X		X	х	X	
L410H	410 BHP 306 kW	1450 ft-lb 1966 N-m	Υ	X		X	X	х	
L400H	400 BHP 298 kW	1650 ft-lb 2237 N-m	Y	X		х	X	X	
L380H	380 BHP 283 kW	1450 ft-lb 1830 N-m	Y	Х	?	х	X	х	
L350H	350 BHP 261 kW	1350 ft-lb 1830 N-m	N	X	х	х	X	X	
L350HU	350 BHP 261 kW	1150 ft-lb 1559 N-m	Υ						X



Cummins X10 MHD Spec

Productivity Series Ratings

Medium Heavy Duty Certified TM10 Aftertreatment System Idle Speed: 700-800 rpm

No Load Governed Speed: 2400 rpm

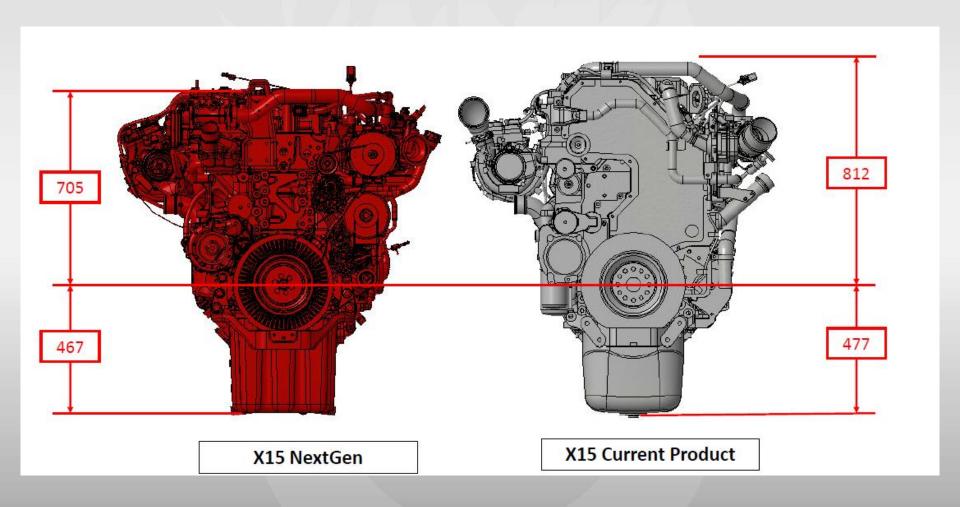
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ID	Advertised Power @2100 RPM	Torque Peak @1200 RPM	Restricted	Truck	Refuse	Vocational	RV/Coach	Emergency	Shuttle Bus
L450	450 BHP 336 kW	1250 ft-lb 1695 N-m	Υ				Х	×	
L400	400 BHP 298 kW	1250 ft-lb 1695 N-m	Υ				Х	Х	
L380	380 BHP 283 kW	1250 ft-lb 1695 N-m	Z	X	?	X			X
L380	380 BHP 283 kW	1150 ft-lb 1559 N-m	Υ				Х	X	
L370	370 BHP 276 kW	1250 ft-lb 1695 N-m	Z	X	?	X		X	X
L360	360 BHP 268 kW	1150 ft-lb 1559 N-m	N	X	X	X	X	X	X

ID	Advertised Power @2100 RPM	Torque Peak @1200 RPM	Restricted	Truck	Refuse	Vocational	RV/Coach	Emergency	Shuttle Bus
L350	350 BHP 261 kW	1050 ft-lb 1423 N-m	Ν	X	Х	Х			X
L350	350 BHP 261 kW	1000 ft-lb 1356 N-m	Ν	X	X	X			X
L320	320 BHP 239 kW	1000 ft-lb 1356 N-m	Z	X	Х	X	X	X	X

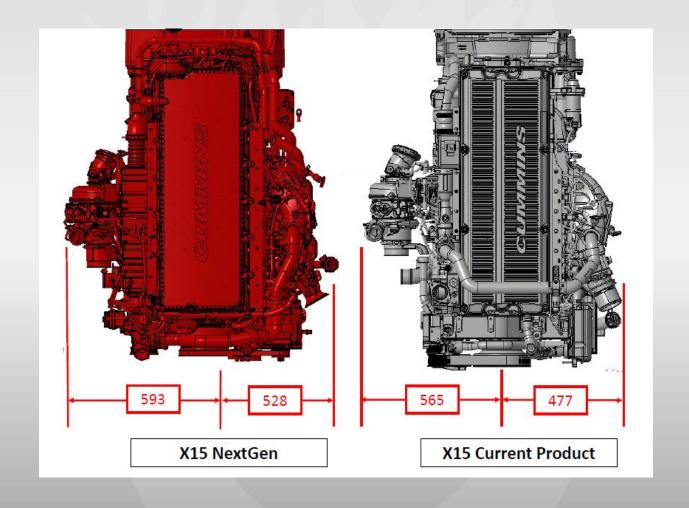


X15 Next Gen Design



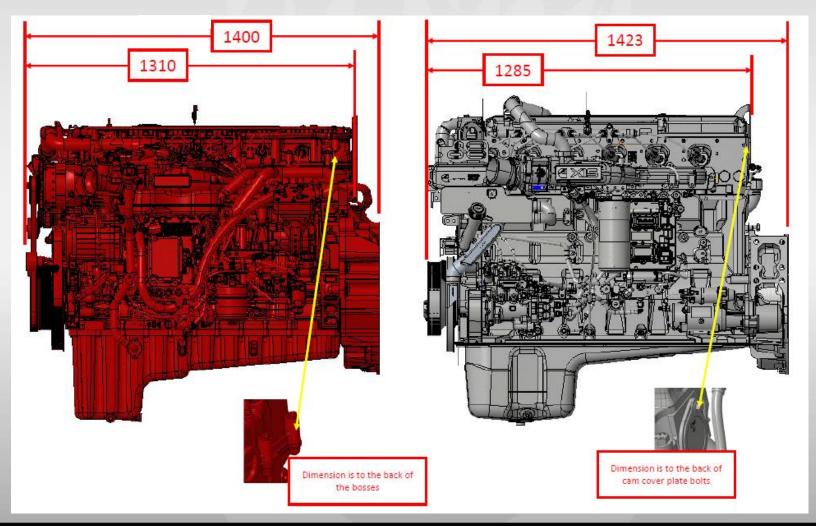


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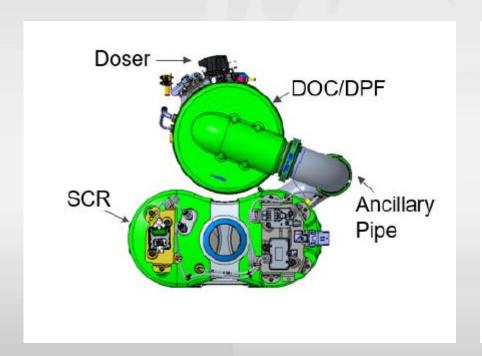


X15 Next Gen Design





Cummins Exhaust Canister – Stacked Design





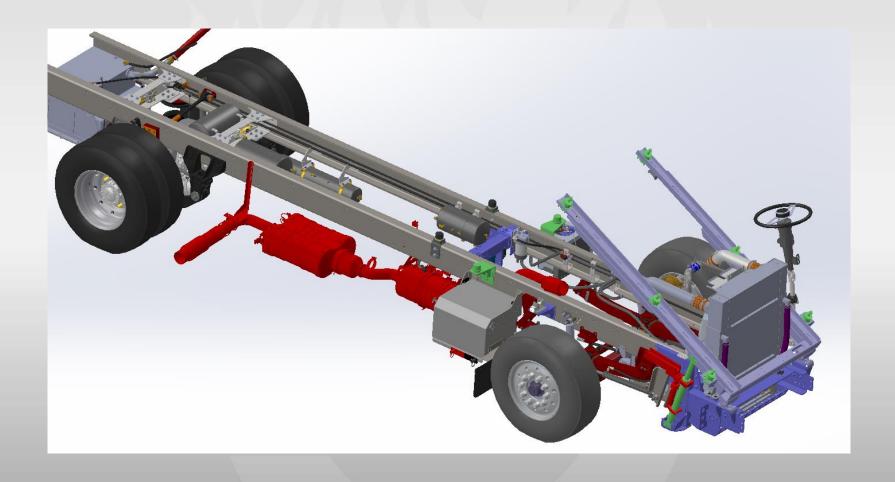


Cummins Exhaust Canister Update

- Original 2 canister design all got shoved into a single canister, and is not going back to a dual canister design, but bigger.
- New design is based on new Federal guidelines for startup to increase heat with an updated heater.
- Canister location for SPH is still to be determined. Various locations available are the entire R1 or under the turntable and having to redesign the belly bars.
- Delete aux heater. Back in the day they would circulate hot water out of the pumper and run it to the engine to cool the pump. Refer to this as your appendix. With today's technology of new pump designs and engine designs this is no longer required.



Cummins Exhaust Canister - In Line Design





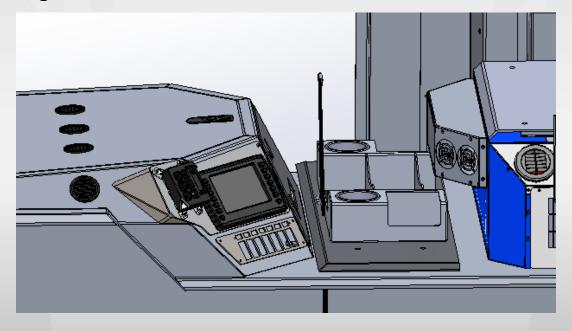
Cab Updates Needed

- Sutphen will be addressing the following areas when it comes to the new Cummins engines. No major overhauls. Looking to design for consistency across engine offerings.
 - Engine Hood Design
 - Engine Tunnel Accommodation for X15 (turbo, slant back in crew area)
 - Tilt Frame
 - Canister Placement
 - Stainless Surge Tank
 - Cooling Package



X15 Engine Hood

• What if there was an option to not have the lower command console extension with a X15 engine?



• Chassis engineering is also looking at designs to incorporate this with the new X10 engines as well so that Sutphen will be able to offer one consistence engine hood design for all Cummins engine offerings moving forward.



Winch Receiver Ratings

- NFPA states the receiver has to be rated at two times the rating of the winch. So if that is the case, we can only use a max. 5,000lb. winch on any of our receivers.
- Power limits to be considered with winches and rated capacities.
- The front electric winch rating would be no more than 8K as advertised because our electrical system won't allow it to go higher than that regardless of the winch capability. Please refer to the following pages for winch rating per the manufacture.
- More Information to follow in Upcoming Sales Technical Bulletin.



• Development and construction of the 2nd tiller. First one with a pump and a tank.







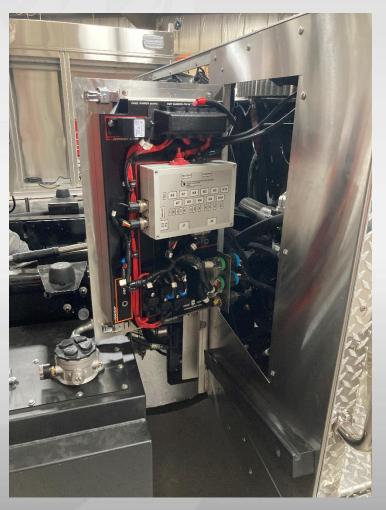




- Development and construction of the 2nd tiller. First one with a pump and a tank.
- Harness design. We have created and documented many new harnesses, to help reduce production hours and improve design consistency.
- Mini tower hydraulic compartment VEC box service panel improvements. This will reduce production hours, improve consistency in design and serviceability.



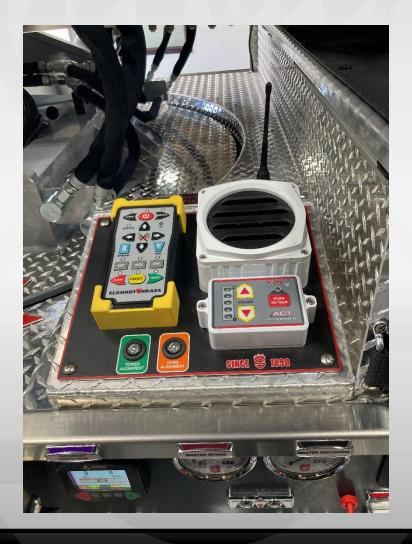






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- SL75 control station. This is not yet implemented but has been prototyped on a couple trucks.







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- SL75 control station. This is not yet implemented but has been prototyped on a couple trucks.
- Purchased new brake press with the goal of bringing body panel production in house.
 This will help us control quality with more control over lead times on parts. A more diverse range of dies with this press will allow us to produce more complex and one-off parts in house.







Hilliard Cab Prep

- Operations and functions from old Urbana C01 will now be taken over by Hilliard and processed in Raw Cab Finish area.
- Functions such as:
 - Overhead compartments in crew area
 - Seat Risers
 - 73" cab will see 21" deep seat riser
 - 56" and 62" cabs will be 19" deep seat riser
 - IMMI SCBA holder will require 21"
 - Exterior Cab Compartments moved to line stages
 - Doors to be hung by chassis after paint
 - Painting all interior of compartments to match cab interior

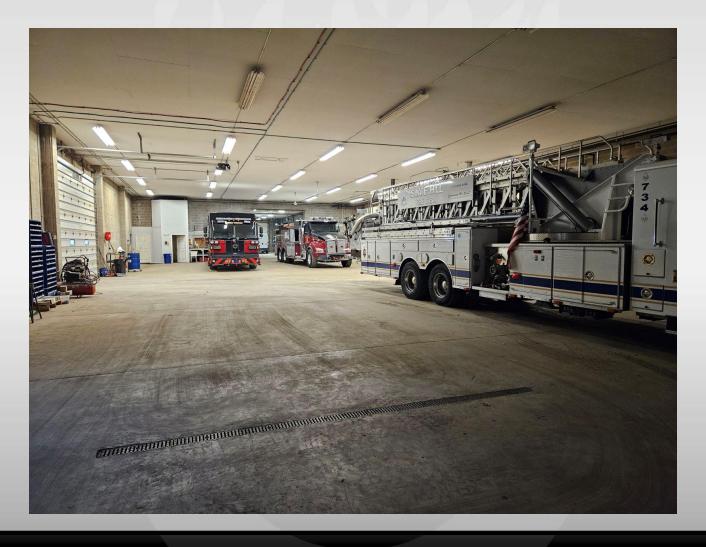


East Facility Improvements

 New 25,000 Sq Ft service center now under multi-year lease and operational. More improvements, developments and hiring will support this new service center.



East Facility Improvements



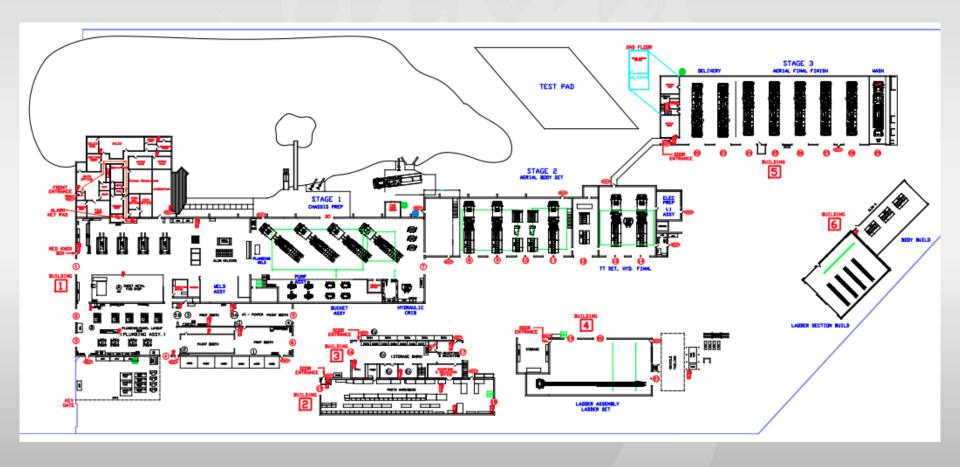


East Facility Improvements

- New 25,000 Sq Ft service center now under multi-year lease and operational. More improvements, developments and hiring will support this new service center.
- Re-configured body sub assembly to support 3 bodies in production at all times.
- Increased production. Flat out, 24 units out of the production bay through the first six months of FY2023. This is a new record for SE.
- Hiring more personnel weekly.

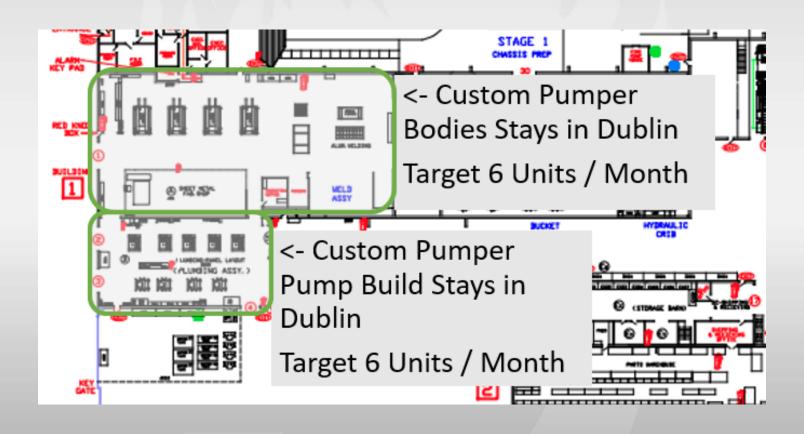


Dublin Facility Layout - Future State





Dublin Pumper Transformation



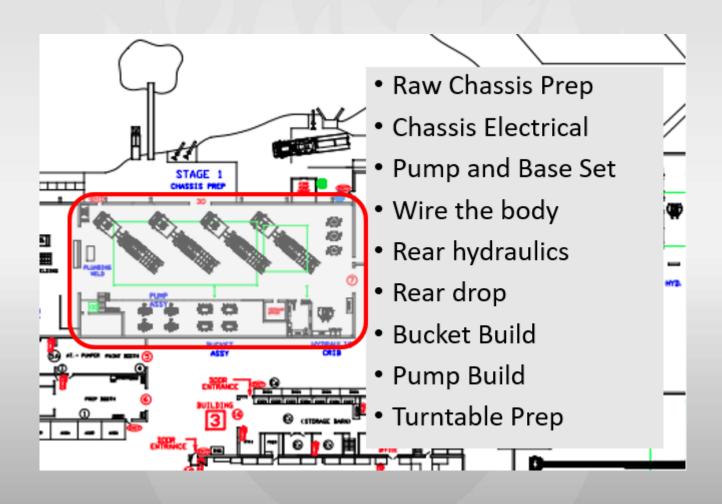


Sutphen Dublin Facility Improvements

- Aerial utilizing previous space for Custom Pumper Body assembly and finish.
- Goal is to Increase Dublin Aerial Production
 - Historically 2 aerials per month
 - Growth to 3 per month in 2024
 - Future Target of 4-5 aerials per month by 3/1/25
 - Intended target with increased production is to get lead-time under
 2 years
- Challenges to Consider during progress
 - 83 Total Direct Labor Team Members
 - 2.5x increase in all components
 - Leadership and Engineering
 - We need your Dublin Aerial Orders!!!

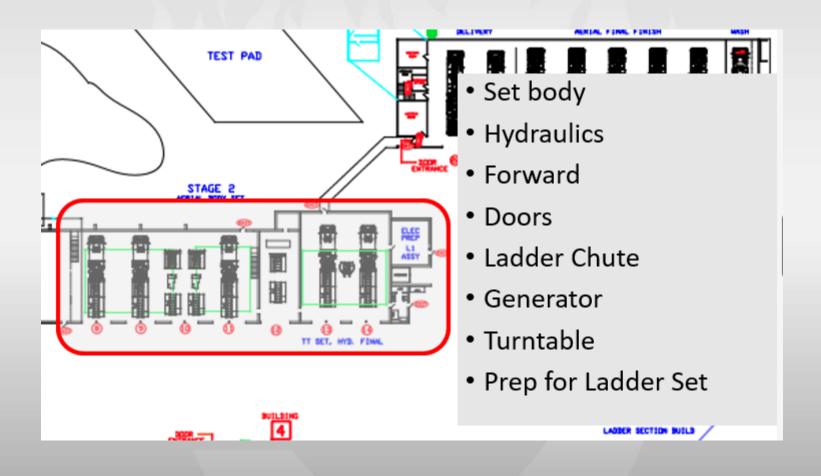


Dublin Aerial Stage 1



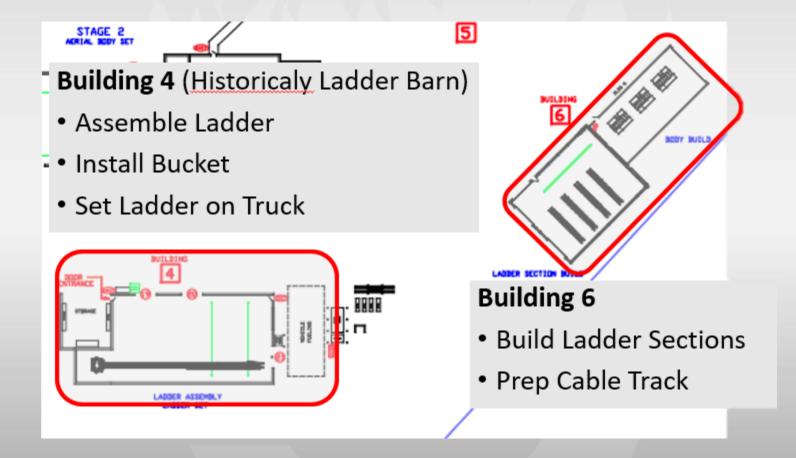


Dublin Aerial Stage 2



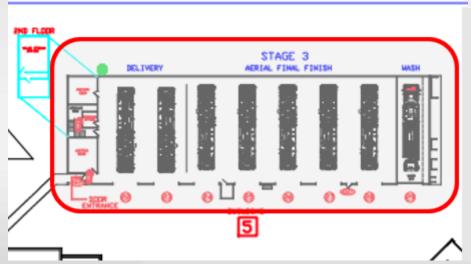


Dublin Ladder Build Areas





Dublin Aerial Stage 3

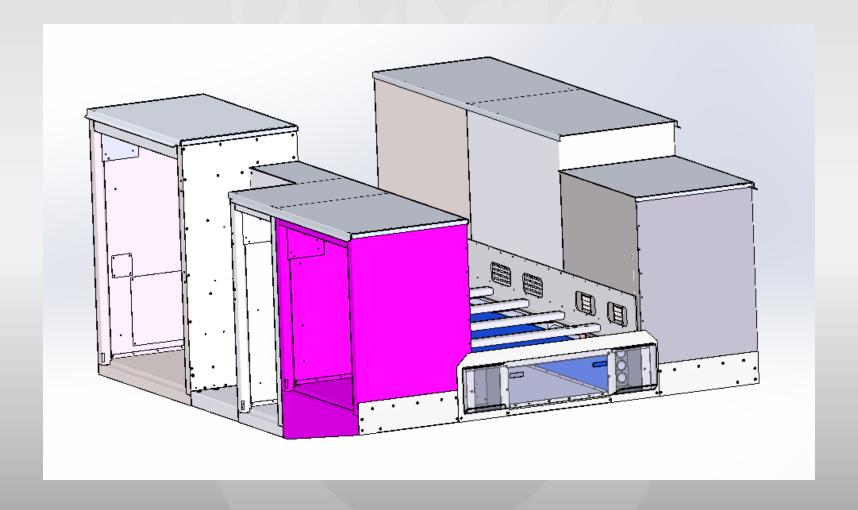


- Close out Electric
- Electrical QC
- Final Assembly
- Program Aerial
- Third Party Testing
- Graphics
- Final Inspection

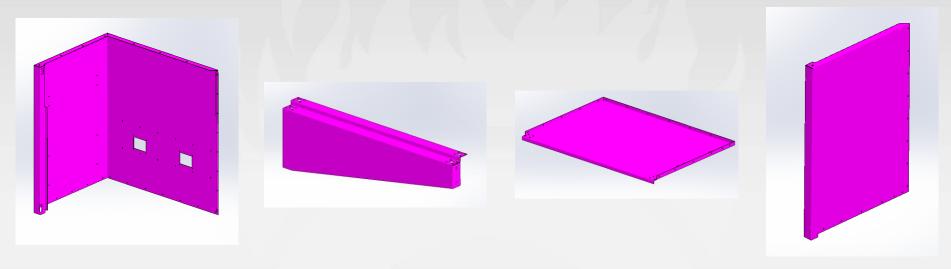


- Addressing SPH Body Sag
 - Remove 2" front suspension spacer to match Hilliard
 - Consider implementing Hendrickson Rear Suspension to reduce deflection
- SPH Innovation / Options
 - Combined L5/L6 Compartment Option
 - Redesigned modular rear compartment base for replaceability



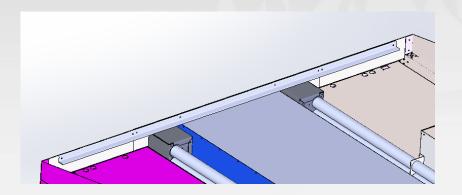


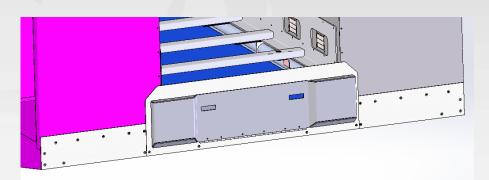




- Isolated components to show above for clearer idea of how each component goes together.
- Split the floor and fender into 2 pieces to create a more serviceable compartment.
- Split the wall from 1 piece to 2 pieces for improved alignment from the vendor.





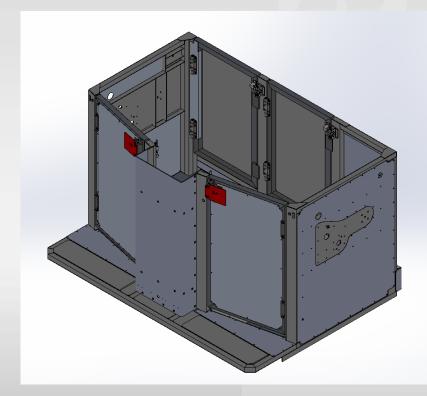


- We split the rear treadplate into 3 components to help with disassembling the entire end of the truck to replace the components.
- We are adding an angle across the bottom of the treadplate to help support the end from deforming due to flex.
- This will allow us to keep the A1 in position while replacing components on either compartment.

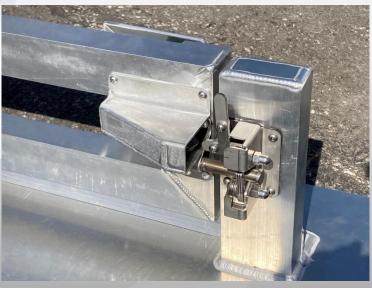


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 - Upgraded forward design for durability and ease of production and maintenance
 - Improved lighting on the turntable and hose bed







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 - Alignment arrows on turntable and treadplate
 - Standard 13" Frame Rails for 112' Industrial Chassis





