Town of Peshtigo – Engine 205 Replacement

June 21, 2022

Replacement Engine Purpose

Purpose

- Purpose of the committee is to create specifications, solicit bids and secure a contract for a replacement of a 28-year-old commercial chassis pumper.
  - Target Deliver 2025
  - Provide a safe and dependable apparatus to serve the residents of the Town of Peshtigo for the next 30 years based on the Fire Department long term plan.
  - Specifications are based on the current and anticipated future needs of equipment in the fire service
  - Changes in how firefighting is conducted now in comparison to 28 years ago
  - Changes in apparatus technology and NFPA requirements
  - NFPA compliant apparatus
  - Receive approval of Members, Fire Commission and Town Board to proceed with sending out a bid package and accepting a bid for a replacement engine.
  - Specify a ballpark cost of engine so Town Board and Fire Commission can secure the required funding for the apparatus. As of 6/16/2022, investments for the fire department are at $199,162.14

NFPA 1901 – APPENDIX D

Annex D Guidelines for First-Line and Reserve Fire Apparatus

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

D.1 General. To maximize fire fighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities. In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent Underwriters Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901 have been truly significant, **especially in the area of safety,** fire departments should seriously consider the value (or risk) to fire fighters of keeping fire apparatus **more than 15 years old in first-line service.**

It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status; be upgraded in accordance with NFPA 1912; and incorporate as many features as possible of the current fire apparatus standard (see Section D.3). This will ensure that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available to the fire fighters who use the apparatus.

Apparatus that were not manufactured to the applicable NFPA fire apparatus standards or that are over 25 years old should be replaced.

E205

- Engine 205 is a 1994 Pumper that was built by 3D Manufacturing in Shawano WI (28 years old)
- Operated as frontline pumper from 1994 until 2010 when Engine 207 was purchased and went into a reserve role
- 2-man cab
- 1000-gallon water tank, 20-gallon Class A foam tank, 20-gallon Class B foam tank
- 1000 gallon per minute (gpm) pump
- Compressed Air Foam System (CAFS)
- SCBA – 8 packs and 16 spare bottles
- Carries all equipment needed for structural fire protection.
- Approximate Value if we were to sell is estimated at **$5K - $10K**

Replacement Engine Minimum Requirements

- Meet the requirements of NFPA 1901 as practical
- Additional safety features that are now found in apparatus
  - Frontal impact air bags
  - Side impact curtains (air bags)
  - Vehicle data recorder (required by NFPA 1901)
  - Bright colored seat belts (required by NFPA 1901)
  - Increased visibility for driver (field of view)
  - Back up camera(s)
- 1500 gpm pump
  - This will assist in our **ISO rating**
  - Building construction has changed in the Town of Peshtigo and the required fire flow for these type of structures has increased (note: E207 has a 1250 gpm pump)
- Master stream device
  - This will assist in our **ISO rating**
  - Building construction has changed and the required fire flow for these type of structures has increased (note: E207 has a 1250 gpm pump)

Replacement Engine Minimum Requirements (Cont'd)

- 1000 gallon water tank, 20 gallon foam tank
  - Large water tank required to have a sufficient water supply until an external water supply can be established (holding pond and/or hydrant hook up)
- Minimum 5-man cab
  - Have enough members on an engine to start fire attack when arriving on scene
  - Change of response where members are keeping their gear at the station. Therefore, responding to the station rather than directly to the scene
  - When responding to service / non-fire incidents, allows for additional personnel to be in one apparatus
- Perimeter Scene Lighting
  - Sufficient Scene Lighting by adding scene light to the front, sides and rear of apparatus
- Rear Supply Inlet
  - Our standard operating procedure is to pull into driveways and set up our water supply (holding pond) behind the apparatus
- Cross Lays in front bumper
  - Our standard operating procedure is to pull into driveways. Hose lines would be readily available for deployment without interfering with pump operations
- Side Mount Pump Panel
  - Minimize wheelbase of apparatus

Enhanced Option List

- Cascade System
  - Allows for the filling of SCBA on scene
  - Currently depend on neighboring departments to fill our air packs on scene.
- Enclosed pump panel
  - Prevent the elements form getting at the discharge, intake and pump controls while responding to and returning from an incident (standard on a PUC chassis)
- Enhanced warning package (warning lights that dim on scene)
- Refrigerator (possible room in cab with a custom chassis)

Side Pump Panel Corrosion

Body Compartment Corrosion

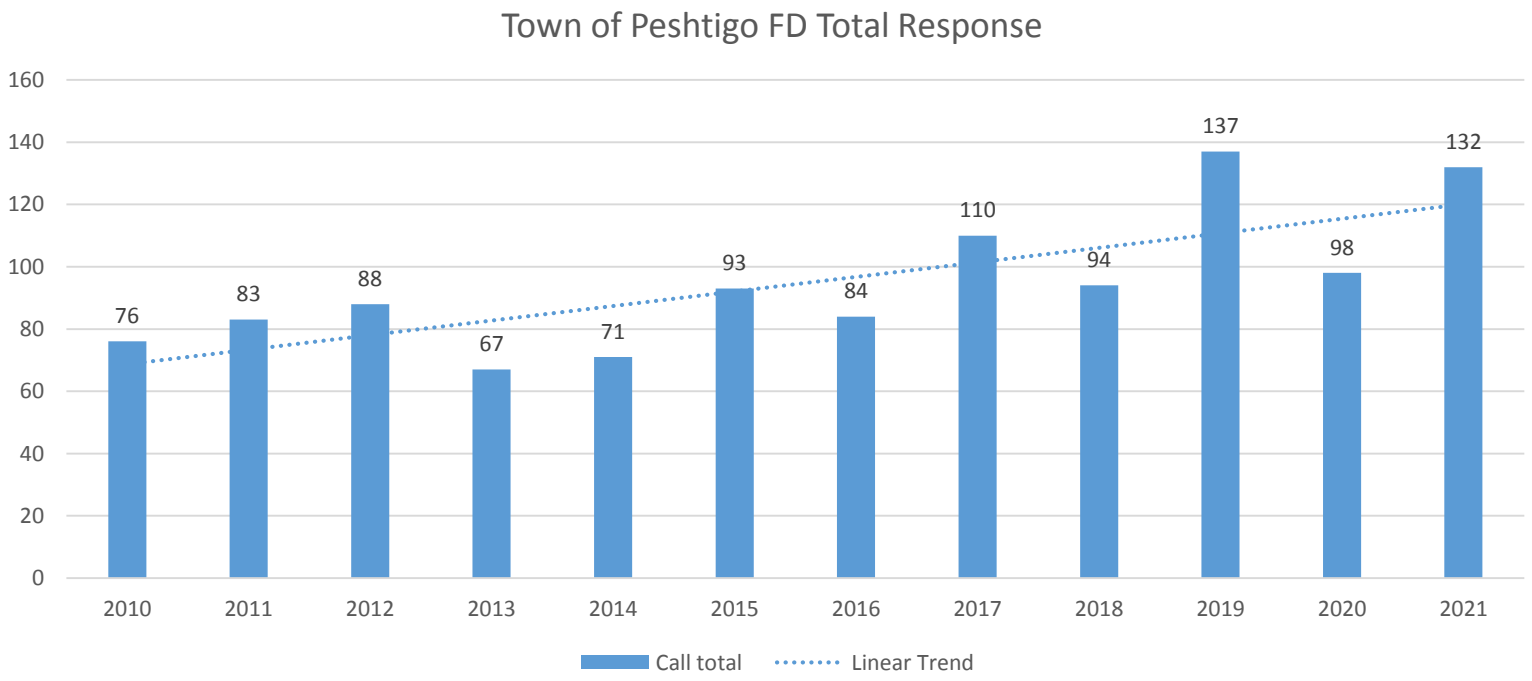
Front Bumper Corrosion

Response Statistics

Response Statistics

Town of Peshtigo Fire Department Response Trend (all incidents)

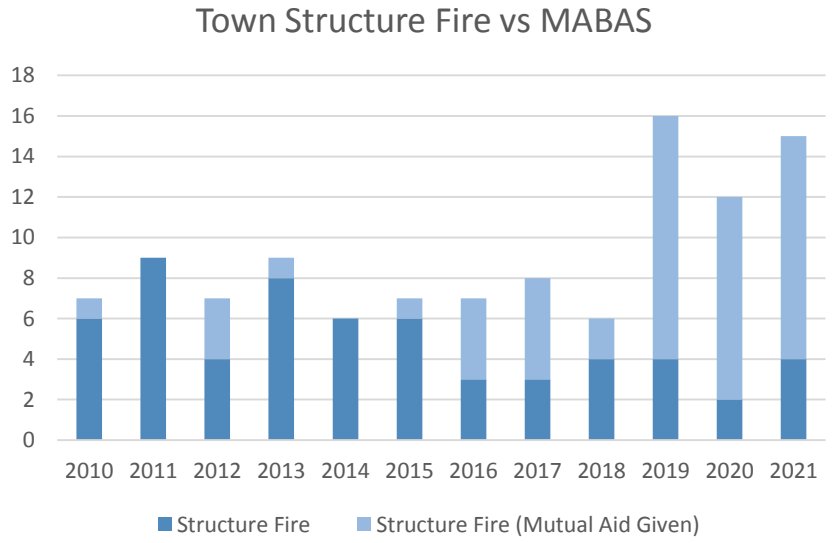
- Total Response Increase
  - The TOPFD has seen ~20% increase in the average response volume since 2010

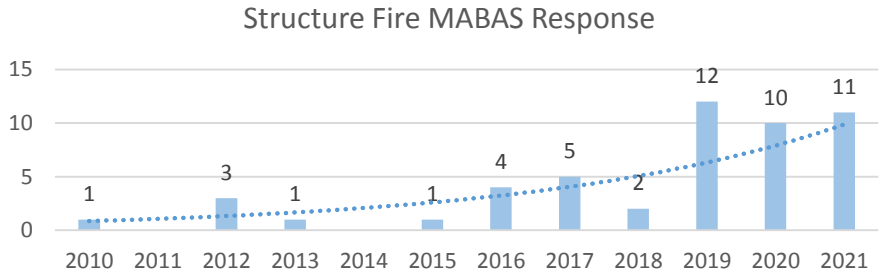


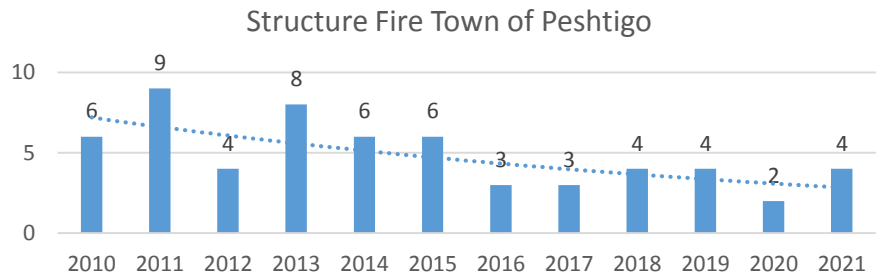
Response Statistics (Cont'd)

Town of Peshtigo Fire Department Response Trend

- Structure Fire Response
  - While the number of responses for structure fires has greatly decreased within the Town of Peshtigo the trend of total response has increased since 2010
  - Town of Peshtigo Fire Department provides aid to our neighboring communities as part of the Mutual Aid Box Alarm System (MABAS)

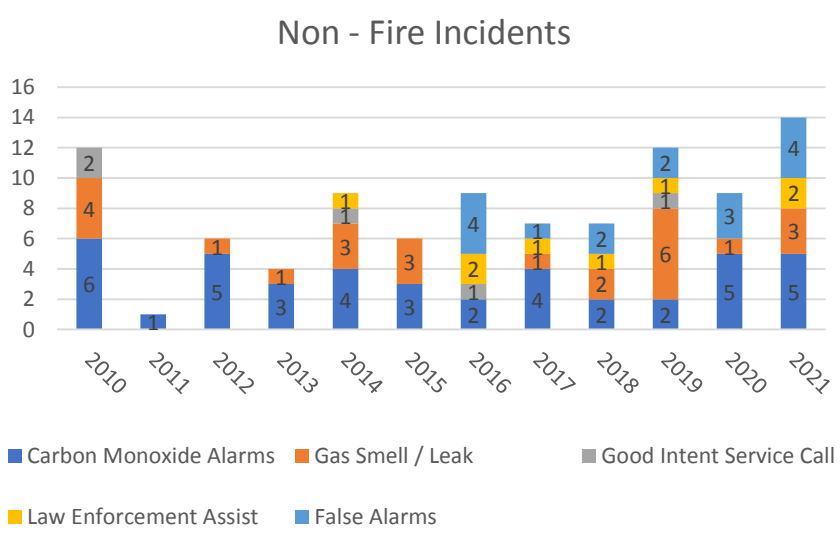


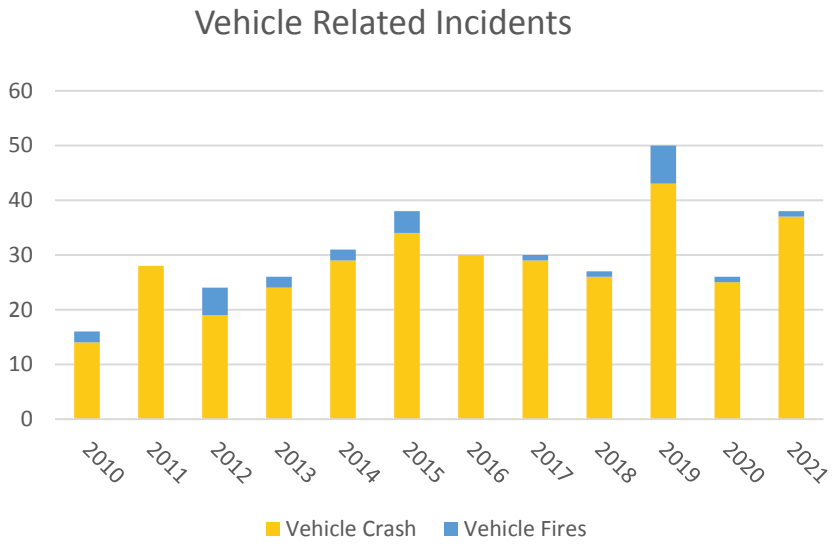




Response Statistics (Cont'd)

- Non-Fire Related Incidents
  - CO Calls, Law Enforcement Assists, False Alarms, Gas Smell Leak, Good Intent
  - These type of incidents still require us to respond to help mitigate the hazard
  - Typically, will send an engine company as the equipment needed for these type of incidents is located on the engine (i.e. 4 gas meter, fans, thermal imaging, etc.)
- Vehicle Crashes / Fires
  - Require response with a full engine company
  - For vehicle crashes / fire, we minimize private vehicles on the roadway for safety reasons





Custom Chassis Engine (2 Options)

Custom Chassis (PUC) - High Level Specification

- PUC – Pump Under Cab
- Approximate Cost - $750K
- Hydraulic Pump that allows for pump and roll capabilities
- Comes standard with enclosed pump panel
- Allows for a 5-man cab
- No Pump Module
- Ergonomically Friendly
- 195.5” Wheelbase (shortest wheelbase)
- Allows for speed lays to be out of the pump panel area
- Standard enclosed pump panel
- This configuration allows for maximum amount of storage

Custom Chassis - High Level Specification

The custom chassis

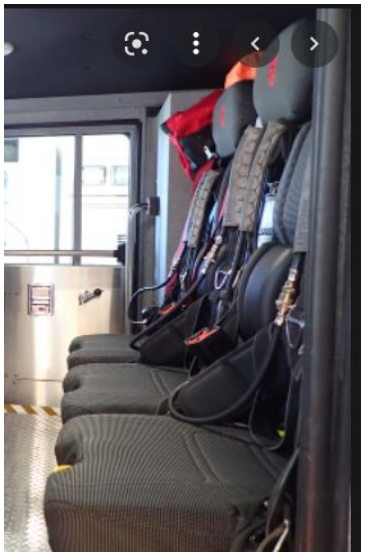
- Approximate Cost $715K
- Allows for a 5-man cab
- Allows for cabinets in the cab that are also accessible from the exterior of the apparatus
- Ergonomically Friendly
- 215” wheelbase

Custom Chassis – Common Specification

Apparatus Dimensions / Capacity

- Gross Vehicle Weight: ~49,000 lbs.
- Front Axle Rating: 18,000 lbs.
- Rear Axle Rating: 31,000 lbs.
- Top Speed: 68 mph
- Engine: Diesel 350-450 hp
- Transmission: Five (5) Speed Push Button Shift
- Frontal and Side airbag protection
- Allows for rear facing cabinets in the cab that are also accessible from the exterior of the apparatus

- Pump Controls at eye level
- Rear Walk through
- Seating for Five (5) Members
  - Driver's Seat will be adjustable for multiple driver configurations
  - Officers Seat will be fixed but include SCBA style back
  - Three forward facing crew seats will be fixed and include SCBA style back



Commercial Chassis Engine

Commercial Chassis - High Level Specification

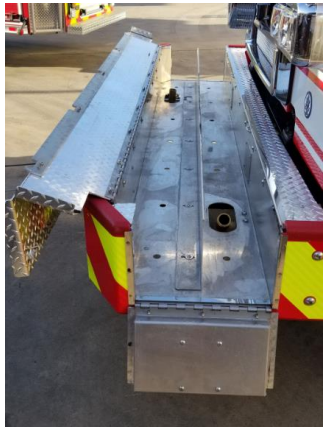
- Limited to 4-man cab (with cabinet in cab)
- Approximate Cost $545K (Chassis price cannot be locked in at this time, pricing will be locked in when chassis goes on assembly line)
- Options are minimal as this is a standard production line chassis, not designed for fire service
- Safety features limited to commercial chassis offering (no front impact/side roll protection from chassis OEM. One apparatus builder offers side roll airbag seats.)
- Paint is limited to manufactures paint selection
- Customization is limited as it is a “commercial” chassis
- 265” wheelbase (longest wheelbase)

Common Specification (Body)

Common Specification

- Hose
  - There will be speed lays located next to the pump controls
    - 200ft of 1-3/4” fire attack line
    - 200ft of 2-1/2” fire attack line
  - There will be hose lays in the front bumper
    - 250ft of 1-3/4” fire attack line
    - 100ft of 1-3/4” “trash” line
  - In the hose bed there will be
    - 800ft of LDH
    - 300ft of 3” fire hose
    - 500ft of 2.5” fire hose
  - SCBA Requirement
    - In addition to the (4 / 5) SCBA’s in the cab of the apparatus, there will be (1/ 2) additional for the driver/operator plus a spare and a total of (6) spare bottles (NFPA Requirement)
- Ladder Rack
  - There will be a ladder rack on the passenger side of the apparatus that will have an extension ladder and roof ladder stored on it
- Suction Hose
  - Suction Hose will be located in the rear of the apparatus
- Cascade System
  - 3 bottle 6000 psi
  - Bottles to be located in hatch compartments at top of apparatus
  - Fill Station will be located in one of the compartments

Common Specification (Pictures)



Front Bumper w/ Cross Lays

Cascade Fill System

Ladder Rack

Specification Comparison – Pro’s and Con’s

Comparison Matrix

	"PUC"	Custom	Commercial
	$750K	$715K	$545K
Wheelbase	195.5	215	265
Front Air Bag	Yes	Yes	No
Side Air Bag	Yes	Yes	No
Seating	5	5	4*
Rear Facing Cabinet(s)	Yes	Yes	No
Center Console	No	No	Yes*
Cabinet Access from Outside	Yes	Yes	No
Walk through Cab	Yes	Yes	No*

* 5 Man Cab is possible if the center console is removed. This would not allow for any storage in the cab

Custom Chassis

Pro's

- **Safety**
  - Higher survivability in crash tests and crashes
  - Enhanced Safety features in cab (air bags, option to exit away from hazards, etc.)
  - Improved driver field of view
  - Does Not allow exterior air into cab minimizing "dirty" air / carcinogens into the cab at an incident
- **Overall Length / Wheelbase Shorter**
  - Shorter Turn Radius (PUC has the shortest)
  - Better Maneuverability into Smaller / Tighter Spaces
- **Increased Firefighter Seating**
  - Minimizes Personal Vehicles at any Scene
  - Minimizes Apparatus On Scene in the Town
  - Minimizes Apparatus On Scene for MABAS Responses
- **Cab Layout Flexibility**
  - More Storage for Equipment needs for our ever-changing needs
  - Storage access from inside and outside of the apparatus
- **Designed specifically for the fire service**
  - Better air exchange for contaminated PPE and tools
  - Better firefighter rehab space
  - Sufficient room for firefighters in PPE
- **Cab Durability**
  - Extruded aluminum frame minimizing threaded fasteners and thus improving the durability / life of the apparatus
- **Maintenance advantages**
  - Near maintenance points (depending on builder)
  - Better access to pump for maintenance (PUC only)
  - Hydraulically driven pump instead of mechanical (PUC only)
- **Pump and roll option (PUC only)**
- **Purpose built truck**
  - Will meet all aspects of NFPA 1901 where practical
  - 30-year truck designed and built for the specific rigors of the job
- **At the time of order, the Fire Department will have a better idea of the known cost**
  - Either a locked price or a promised price

Con's

- **Cost**
  - A custom cab truck will be 150K to 200K higher in price than a commercial chassis apparatus
- **Maintenance**
  - On some parts for the apparatus, you may be tied to the manufacturer for specific things
  - This could drive part cost higher than a common commercial truck
- **Operation**
  - There will be a learning curve for operating (pumping, driving, etc.) the apparatus as most of the membership has only operated with a commercial chassis truck

Commercial Chassis

Pro's

- **Cost**
  - Expectations is that a commercial chassis apparatus will be 70K to 200K less expensive than a custom / PUC style apparatus
- **Maintenance**
  - Membership is familiar with working on a commercial style apparatus
  - Any local diesel mechanic can work on a commercial style truck
    - Currently the FD is using a business in the Town of Peshtigo to do the maintenance work
  - Common parts will be available from local suppliers in the tri-city area
- **Familiarity**
  - All of the current membership is familiar with the operation (driving and pumping) of a commercial chassis apparatus
- **Commercial style trucks are used by most rural fire departments**
  - There are a lot of these style apparatus on the road and in use today
  - Commercial style apparatus have a proven track record of service in rural departments

Con's

- **Safety**
  - Crash test ratings vs. custom chassis for front and side impact and roll-overs
  - Safety features inside the cab (air bags, options to exit away from hazards)
  - Survivability
  - Air Filtration allows for exterior air to enter into the cab.
- **Overall Length / Wheelbase is longer**
  - Not as maneuverable or able to fit in tighter spaces
- **No Increased firefighter seating (4 members max with cabinet)**
  - Could increase the amount of POV's and apparatus on any incident scene
  - Will increase the amount of apparatus on most (any requiring a Chief Officer) MABAS responses
- **Cab Layout Flexibility**
  - No increased storage from current state
- **Cab Durability**
  - Fiberglass / Aluminum cab not built for the fire service leading to a less durable product and possibly shorter life / higher maintenance costs
- **Availability of Chassis**
  - 2023 slots are full and no longer taking orders for 2023
  - 2024 quickly filling up and by time of order may not be available
- **Pricing**
  - Cannot lock the price at the time of order
  - Vendors are adding 15% or 22K to the price of a commercial chassis currently
  - Vendors are not quoting firm prices until the chassis is allotted to them from the builder
    - Could lead to a large unplanned expense
  - Commercial Chassis availability is out past 2024 which Could lead to multiple price increases by model year 2025 driving the cost up of a Commercial style apparatus

Safety Comparison – Custom vs. Commercial

Safety Comparison – Custom vs. Commercial

Summary - Safety

- Pass-Fail criteria of all of the SAE and ECE 29 testing is a measure of whether the “survival space” inside the cab is compromised, all doors remain shut, and the cab remained attached to the chassis frame in at least one location
  - Custom cab chassis far outperform the commercial chassis in all the testing due to the fact that they are purpose built for the job
  - This means that our membership has a much better chance of returning home to their family after an unfortunate accident with our apparatus

COMMERCIAL CHASSIS




CUSTOM CHASSIS



Summary

Summary

- A custom cab is a more expensive option. However, it meets the departments performance and response needs for the foreseeable future. Here is a summary of why a custom chassis is the best fit for the department
- A custom cab has a shorter wheelbase and allows for more maneuverability for our rural roads and driveways. PUC is the shortest wheelbase.
- A custom cab is designed for fire service operations
- Both commercial and custom cabs are required to meet the same federal crash testing standards.
  - Custom cab chassis far outperform the commercial chassis in all the testing as they are purpose built for the job. This means that our membership has a much better chance of returning home to their family after an unfortunate accident with our apparatus
- A custom cab has more integrated safety features
  - Frontal and Side impact airbags
  - Air circulation is designed to reduce and filter out the number of carcinogens / contaminants from soiled turn out gear
- A custom cab is ergonomically designed for firefighters in turnout gear
- A custom cab allows for space in the crew area for rehabilitation

Summary (cont'd)

- A custom cab has more options for interior storage while maximizing the number of seated positions (5)
- A custom cab allows for rear facing cabinets that will have our battery chargers, 4-gas meter(s), box lights, thermal imaging camera's, AED, First aid kit, PPE (medical) and other smaller items that are used on most incidents.
  - Accessible from exterior of apparatus
- Pump configuration is easier to conform to a custom chassis than a commercial chassis
- Front bumper cross lays allow for easy access and deployment of hose line
- Speed lays behind cab allows for hose to be removed from the hose bed and more readily accessible at an incident. Lowers the center of gravity (CG) of the apparatus which helps to minimize the rollover probability from a higher CG.
- Enclosed pump panel can help prevent corrosion to the valves from road contaminants and increase the life expectancy of the apparatus (30 years). Standard on a PUC.
- A cascade system allows for refilling of SCBA bottles at the incident. Reduces number of spare bottles needed to be carried
- PUC maximizes amount of storage available.
- Configuration for compartments (i.e., shelves, peg boards, mounting fixtures) is dependent on what option we are moving forward with

Questions

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