Enhancing safety, capability & simplicity

Aerial apparatus challenges and trends

Boom elevation, extension and rotation are critical hydraulic functions on aerial fire trucks. Whether a pumper or platform, the boom needs to reach its target location quickly yet safely.

While today’s ramped controls are an improvement over abrupt starts and stops, uncommanded movement resulting from these ramps limits boom extension speed and placement accuracy. In some cases, ramped controls can present safety hazards.

Booms are subject to oscillation, also known as boom bounce, due to quick movements and disturbances such as wind, the flow of pumped water or individuals on the ladder. This oscillation is magnified the further the boom is extended.

Eaton’s system solution for aerial fire apparatus can help manufacturers eliminate boom bounce and address a variety of challenges and trends in modern aerial design.

Safety

- **Reduce boom bounce**: Quick boom movements and external disturbances can cause the truck’s boom tip to oscillate, which limits the speed and control with which firefighters can deploy the boom. Boom bounce can be particularly hazardous to those climbing the ladder on platform trucks.

- **Implement advanced safety controls**: The ongoing drive to improve safety is leading to more integrated safety controls that mitigate hazards such as striking a building or tipping the truck.

Capability

- **Enable faster point-to-point movement**: The faster a boom can be positioned, the quicker firefighters can get to work – whether it’s accessing a building, rescuing individuals from height or dousing flames.

- **Increase platform capacity**: As buildings continue to increase in size and complexity, the ability to reach higher and carry more gear becomes critical.

Complexity

- **Provide more customization options**: Municipalities come in all shapes and sizes. Manufacturers must offer highly customizable vehicles to ensure buyers have the right equipment for the job.

- **Simplify interconnected systems**: Commonizing hardware and communication networks simplifies the integration and service of systems and functions.
Eaton’s system solution for aerial fire apparatus can increase safety and truck capabilities while reducing system complexity. The centerpiece of this system is the CMA advanced mobile valve, a CAN-enabled electrohydraulic valve with onboard electronics and integrated software algorithms that increase vehicle productivity, safety and efficiency.

**Boom stability control**
An integrated control application on the CMA valve, boom stability control (BSC) technology reduces boom oscillation by up to 75% and boom settling time by up to 90%. BSC can be active even when the operator is not commanding the boom, keeping the aerial stable and in position at all times. This technology provides superior control to augment operator skills, significantly reduce the impact of external disturbances and provide peace of mind to those on the ladder or platform. BSC maintains apparatus safety and manual override features, and works in tandem with Eaton counterbalance valves to reduce CBV-related judder.

**Faster point-to-point movement**
Boom stability control enables operators to deploy and stop the boom more quickly, safely and precisely than with ramped controls, resulting in faster positioning of the platform or hose and greater placement accuracy.

**System simplification**
With software driven-configuration and electronic tuning, the CMA valve streamlines setup and optimization. CAN communication simplifies controller requirements and integration with other CAN-based systems. Common hardware can be used across aerial models; customization and advanced controls are accomplished through software without the need to change the spools or wiring harness. The valve’s onboard controller and sensors ease system integration, minimize external components and provide a wealth of data that can be leveraged for functions such as load detection. The result is a reduction in costs and complexity.

The Eaton CMA advanced mobile valve is at the heart of Eaton’s system solution for aerial fire apparatus. Learn more at Eaton.com/CMA.