Fuel Geysering in Small Motor Systems

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In the year 2016 there were 5.5 million acres burned and 62,085 firefighter injuries due to wildfires. Wildfires are a great place to create the conditions for a fuel geyser in a chainsaw (a necessary tool for any hotshot crew). Fuel geysering is a problem that occurs when a user opens a container with heated and/or pressurized fuel which results in the fuel being sprayed from the tank. This has been a problem for many users, especially firefighters who have been severely injured because of it. The solution created and tested was a two-step safety pressure release gas cap design. Using multiple design techniques, (such as SCAMMPERR) many iterations were used to determine a workable prototype. The prototype underwent a series of tests (pressure, simulated geyser, and gasoline geyser) to ensure the cap met EPA regulations and that pressure was released in the tank during the initial turn. Additional tests were conducted to assure the cap prevented geysers. After three iterations and modifications, the cap held pressure, released pressure, and prevented liquid fuel from escaping when opening a pressurized fuel tank. Further modifications include implementation of a vacuum valve and locking mechanism to improve efficiency. It is vital that we preserve the lives of those who protect and serve our community. The use of the two step safety pressure release cap suggests a potential solution to a serious safety problem that exists for both our firefighting industry as well as individuals using small motor systems.

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