



Explosive Assembly with a Linear Shaped Charge End Cap

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Recent improvements rapid prototyping materials have raised a possibility and practicality of introducing custom components that increase the efficiency, reliability, safety, and simplicity of the detonation. Priming the charge involves accurately placing a detonator, detonation cord, or other initiating device. Priming was traditionally done by wrapping tape around the detonator, LSC, and explosive sheet booster, if required. Previously, the explosive sheet booster material was either taped on top of the charge, or across the end of the LSC, and then a detonator was placed and taped into or on the explosive sheet booster. Taping explosive sheet booster material on top of the LSC required either filing or removing parts of the LSC metal wall. Filing the LSC metal jacket, or removing parts of the LSC metal wall by other means to reach the explosive core for a reliable initiation could be very dangerous. Additionally the explosive sheet booster material was in parallel to the LSC, which decreased the performance of the detonator. Taping explosive sheet booster material across the end involved placing material along a small cross-section, which is less secure, and 90.degree from the optimal direction to pass the shock front from the explosive sheet booster to the LSC.

NSWC Crane has patented an initiation apparatus configured to engage with a "V" cross section of LSCs (referred to as a V-Prime). A V-Prime includes a rubber end cap with a hollow neck designed to fit snugly onto an end of a piece of LSC and provide a structure for assembling or attaching and retaining a detonator cord with a variety of new advantages and capabilities.

First, a V-Prime makes LSC easier to use by adding a manufactured structure to the end of the charge that simplifies priming the charge. And secondly, the V-Prime makes the LSC more reliable by placing explosive sheet booster material in secure, direct contact with the explosive

core of the LSC.

The V-Prime provides a major improvement in securing the contact between the explosive sheet booster material and the explosive core by providing internal cavities that securely house the necessary components (explosive sheet booster, detcord, LSC). In addition, the V-Prime makes the LSC more reliable. Third, the V-Prime makes the LSC safer by protecting the explosive ends of the LSC from impacts and drops. The V-Prime provides a rubber "bumper" to protect the exposed explosive ends of the LSC. Protecting the exposed ends improves the safety of the overall device. Fourth, the V-Prime improves the performance of the LSC. LSCs typically take up to three inches of their length to run-up, or detonate to optimal performance. End priming the LSC with the V-Prime device gives the charge added momentum by reducing the typical run-up distance. Also, because the V-Prime is placed on the end of the charge, and not placed across the top of the charge, the LSC is not over primed. Over priming occurs when a top mounted explosive sheet booster disrupts the effect of the LSC, and further increases the necessary run-up.

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