

CAST TITANIUM CUTS COST OF M777 LIGHTWEIGHT HOWITZER

The U.S. Defense Department has placed a \$176 million order with BAE Systems to produce 87 additional M777A2 155 mm towed howitzers, a weapon system that was made more affordable as a result of novel manufacturing approaches that were applied through a Navy ManTech-sponsored project.

The M777 howitzer is manufactured from titanium alloys rather than steel, which reduces the weight of each gun from 16,000 to 9,000 pounds. The weapon's lighter weight results in substantial improvements in transportation logistics and setup time.

Although titanium improved the M777's functionality, titanium product forms are several times more expensive than steel, and the titanium manufacturing processes are more complex than those for steel. To improve the lightweight howitzer's affordability, the Navy Metalworking Center (NMC) implemented new manufacturing approaches and technologies that reduced the part count, manufacturing costs, and material waste.

The project's primary objective was to replace fabricated, multi-part components with single-piece titanium investment castings. The spade shown here, which stabilizes the weapon during firing, was converted from a 60-part component to a single near-net-shape casting, and was implemented into full-rate production in 2005. The project also demonstrated a 110-to-one reduction in part count of the saddle.

To address another objective, the project's integrated project team developed alternative sources of raw materials and innovative production paths to eliminate machining-intensive processes. Specifically, the NMC project qualified several alternative manufacturing methods, including flowforming, and expanded the vendor network for the cradle tube, which provides structural support to the cannon assembly and recoil systems.

Initial cost savings and avoidance from this NMC project totaled \$40 million before this order for more M777s. ◆



This titanium spade, which stabilizes the M777A2 howitzer during firing, was converted from a 60-piece assembly to a single casting.

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Information on the NMC lightweight howitzer project is accessible at <http://www.nmc.ctc.com/index.cfm?fuseaction=sstory&successid=29>.

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