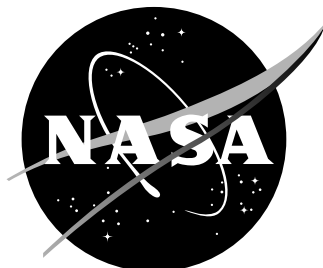


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Technical Support Package

Mechanisms Facilitate Blowdown of Large Diesel Engines

NASA Tech Briefs
SSC-00132



**National Aeronautics and
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Technical Support Package

for

MECHANISMS FACILITATE BLOWDOWN OF LARGE DIESEL ENGINES SSC-00132

NASA Tech Briefs

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Mechanisms Facilitate Blowdown of Large Diesel Engines

BRIEF ABSTRACT

This innovation is a permanent attachment to each cylinder of a large diesel engine, and a separate activation device, for the purpose of opening and closing Kenny Cocks. Kenny Cocks are opened to allow the engine to be blown down before startup. They are closed once the blowdown process is complete. The engine blowdown device makes the process of opening and closing Kenny Cocks faster, easier, and safer.

SECTION I – DESCRIPTION OF THE PROBLEM

Large diesel engines are often blown down before startup. Blowdown is a procedure that is used to detect fuel or water leaks in cylinders. To perform the procedure, a valve called a Kenny Cock is opened on each cylinder. The engine is then cycled. If fuel or water has leaked into a cylinder, it will be ejected through a drain pipe. The presence of fuel or water in the cylinder indicates a mechanical defect in the engine. Once the blowdown procedure is complete, the Kenny Cocks are closed. If no water or fuel is found in the cylinders, the engine can be started.

There are 10 Nordberg diesel engines at the Stennis Space Center. Each engine has 16 cylinders. These engines are used to supply high-pressure industrial water to the A and B test stands during rocket-engine test or for fire fighting. This water is used to protect the flame bucket from the intense heat generated by the rocket engine. It can also be used to fight fires on the test stand or on nearby fuel or oxidizer barges. Three of the Nordberg engines are on autostart and/or standby at all times, in case water is needed for fire fighting on or near the test stands. These engines are blown down each day. The other six Nordberg engines are blown down before each rocket engine test. The blowdown process for all 10 Nordberg engines takes a crew of 3 people 2-1/2 hours to complete.

The previous process of opening and closing Kenny Cocks required technicians to get on their knees or to squat. The opening mechanism is difficult to see and difficult to reach. The possibility of injury was inherent in the process of opening and closing these valves, due to the fact that they are difficult to see and access. The process was also labor intensive and time consuming.

SECTION II – TECHNICAL DESCRIPTION

The blowdown device consists of two components, one which is permanently attached to each cylinder, and one which is not. The component that is permanently attached to the cylinder consists of a swivel socket that fits onto the hex bolt that is turned to open and close the Kenny Cock. An extension is attached to this swivel socket. The extension passes through a bracket that holds it up. A hex nut is attached to the end of the extension that protrudes from the cylinder. The second component is a T-handle with a hex socket attached to the end. To open and close the Kenny Cocks, the technician carries the T-handle device to each cylinder, mates the hex socket on the T-handle device with the hex nut that is attached to the cylinder fixture, and simply turns the T-handle to open or close the Kenny Cock (see Figures 1-10).

SECTION III – UNIQUE OR NOVEL FEATURES

The blowdown device reduces the time required for a crew of 3 people to blow down the 10 16-cylinder Nordberg engines at the High Pressure Industrial Water facility from 2-1/2 hours to 1 hour. It also enhances safety, because workers do not have to squat or kneel and place their bodies in awkward positions as they attempt to see and access the Kenny Cocks.

SECTION IV – POTENTIAL COMMERCIAL APPLICATIONS

The Blowdown Device is particularly helpful for applications in which engines are stopped and started frequently. Some engines are shut down only for maintenance, but they are still often blown down before startup. Possible applications are in the areas of marine, railroad, power generation, and oil- and gas- or water-pumping facilities.



Figure 1



Figure 4



Figure 2



Figure 5



Figure 3



Figure 6



Figure 7



Figure 9



Figure 8



Figure 10