Portable Dyno Serves U.S. Marines

By Bruce Wadman

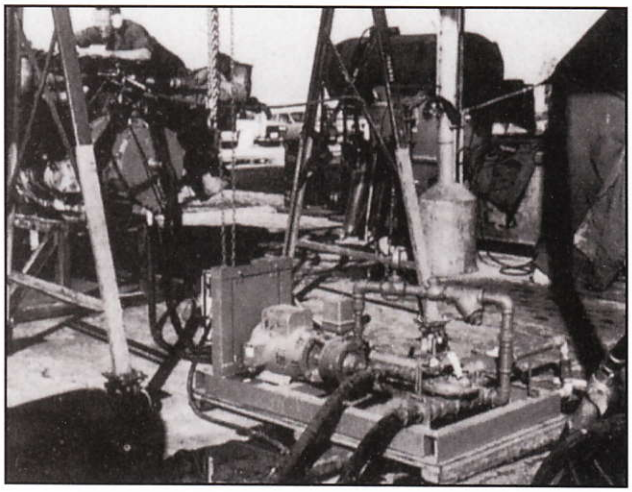
Although waste in military spending has received much publicity recently, there is another side to the coin. For example, a capital investment in a portable dynamometer to properly test overhauled diesel engines for U.S. Marine Corps vehicles has more than paid for itself in the less than two months (at this writing) it has been in operation at the Camp Pendleton, Calif., Marine Corps base just north of Oceanside.

Camp Pendleton's Kahn Series 301 heavy duty portable dyno, able to handle diesel engines up to 800 hp output, has significantly improved the quality control of heavy duty diesel engine overhauls for various vehicles in the Marine Corps inventory. The engines include the specialized Continental air-cooled 1790 AVDS vee type rated up to 800 hp for the M-60 tanks, Detroit Diesel Allison's range from the 53 Series to the 71 Series, and Cummins' 250 Type through VT-903 diesels.

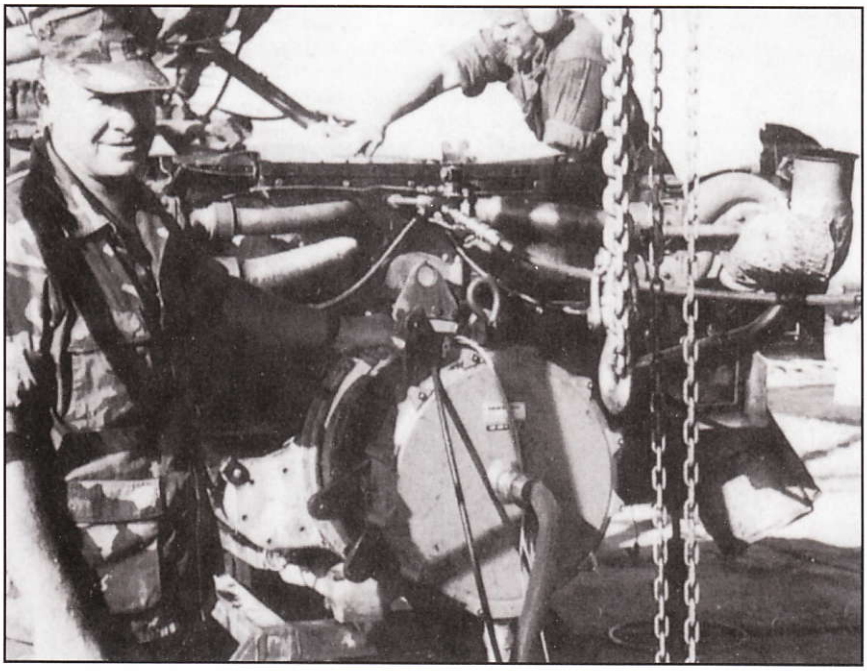
Camp Pendleton has a large repair and overhaul facility for diesel and other major military vehicle components. We recently visited Master Gunnery Sgt. D. C. Craft, maintenance management staff noncommissioned officer in charge of the facility, to discuss the dynamometer's role in reaching Marine Corps goals of producing engine overhauls approaching 100% reliability when reinstalled in combat and supply vehicles.

Craft said upwards of 1000 major diesel engine overhauls annually can be handled at this site — more if necessary. Shop facilities include fuel injection repair equipment, hydraulic equipment repair capabilities and various machine shop and welding equipment. Every type of diesel engine in the Marines' inventory journeys to this overhaul facility at one time or another, according to Craft.

The basic criteria for an engine overhaul decision at Pendleton, incidentally, is whether the over-



Overall view of the portable Kahn dynamometer installation at Camp Pendleton, including the pumping and control console and control valve console.

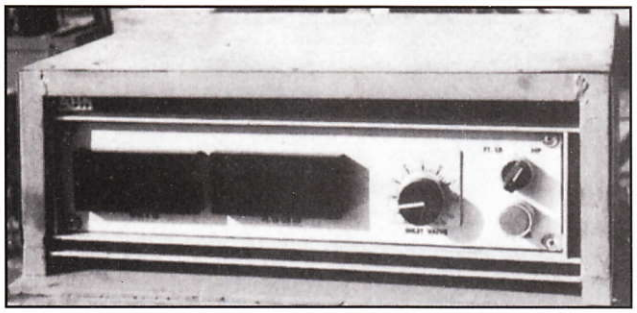


Master Gunnery Sgt. D. C. Craft, who is in charge of the engine overhaul maintenance facility at Camp Pendleton, standing next to the Kahn 301 portable dynamometer shown installed on a Continental 1790 AVDS diesel being dyno tested after overhaul.

haul's cost will equal less than 40% of the engine's original cost. If not, the engine is shipped to other facilities for either disposal or further evaluation outside the Marines' current active diesel engine inventory.

The Kahn portable water brake dyno is presently installed in an open air configuration with free flow of water. A closed circuit water system will soon be installed with water treatment to protect the dyno parts, but initial service requirements include the capability for use in battlefield conditions. Thus, it has initially operated under conditions similar to a fully portable "in the field" environment.

Although portable in concept, the dyno is designed for continuous duty service and is now being used as a continuous duty engine dyno. Normal engine testing periods vary from two to about eight hours, depending on individual engine manufacturer's specifications for dyno run-in after overhaul.



The dyno has a separate, skid mounted pumping and flow control arrangement that is also portable. The entire system can be transported by a single truck to a field site.

With cavitation resistant nickel aluminum bronze absorption elements, grease packed precision ball bearings and water cooled carbon face seals, the 301 dyno mounts directly to the engine flywheel housing. A digital readout unit for engine speed and horsepower output is remotely located, and pushbutton start, stop and load control is currently being installed in conjunction with the readout system.

Also being installed in the engine overhaul shop is a remote, fully enclosed engine dynamometer test room that will eventually be used to test most of the larger diesels after overhaul. It inciudes a remote control room, and Craft told us it is planned to be in operation in early 1985. However, the Kahn dyno will continue to be used regularly.

With a reasonable and judicious capital investment at Camp Pendleton, then, to more thoroughly assure the reliability and top quality of diesel engine overhauls, the U.S. Marines can provide improved combat and supply vehicle performance capability and reliability. Master Gunnery Sgt. Craft emphasized this is being done at a significantly lower overall cost than before the facility had the necessary quality control equipment, such as dynamometers, to insure the performance of overhauled diesel engines. □