More TECHNICAL BRIEFS

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steady state efficiency of the apparatus used for this test was 60.0%. The efficiencies increase with boiler water temperatures up to a maximum of 67.9% at 142° F. Further increases in boiler water temperatures resulted in a drop in efficiency. The boiler water is the principal factor controlling the temperature of the crown sheet of the boiler, and the chilling effect of the crown sheet on the oil flame is, in our opinion, the cause of the lower efficiencies at the lower water temperatures. The drop in efficiency at the highest boiler water temperature is thought to result from the increased heat loss through the uninsulated outer surface of the boiler. *ASME Paper No. 53-F-20.*

Test Results of Medium Speed Engines on Heavy Fuels. *By Russell Pyles, Donald P Cryor, J M A Van der Horst, Van der Horst Corp of America.*

Heavy fuel use in the main propelling engines of ships has every indication of becoming general. Certainly it seems desirable from every angle that the auxiliary engines should be capable of operating on the same type of fuel.

The technical problems associated with heavy fuels in large, low-speed, main engines have had some years of development and study with such success that there are now close to 500 motorships operating on boiler fuels. The problems of the low-speed auxiliary engine (under 500 rpm) may be similar to many of those problems encountered in the large, low-speed, main engines, but as engine speeds increase, the old problems become more acute and new difficulties arise.

Higher speed auxiliary engines will be demanded because of increased power requirements, lighter weight and smaller space. Such engines, operating on regular diesel fuels, are already highly developed as typified by present-day locomotive and marine engines. The most desirable course would seem to be to adapt this type of engine to heavy fuels even though such a course involved development and design changes. *ASME Paper No. 53-OGP-6.*

Converting Waste Engine Exhaust Heat Into Energy. *By Robert C Coblentz, Coblentz Equip Co.*

An immeasurable source of untapped power is the millions of dollars worth of energy which constantly pours from engine exhaust stacks. Diesels, says the author, are tops in thermal efficiency and yet more than half the Btu's in the fuel is rejected to the jacket water or goes up the stack. A high percentage of this heat is recoverable and can be used to advantage. Waste heat recovery in the form of steam, hot water or air boosts overall Btu utilization. Today, through the development of a packaged unit, recovery in the form of refrigeration is possible, thus broadening the field of waste heat recovery application.

Such a packaged unit, now available to the diesel industry, is said to operate automatically at cost. It combines a waste heat boiler and a hermetically-sealed absorption refrigeration system, all mounted on one base.

A 4-cycle, 350-hp diesel engine operating at full load wastes enough heat through the exhaust gases to deliver ample heat units to operate a 25-ton absorption refrigeration unit, therefore packaged units are assembled in different sizes. These sizes range from a unit for a 350-hp engine with a 25-ton water chiller to a 3500-hp engine with a maximum of 250 tons of cooling. Larger units with variable refrigeration requirements can be assembled to meet specific requirements. *ASME Paper No. 53-OGP-5.*

A Photographic Study of Two-Cycle Gas Engine Cylinder. *By R L Boyer, D L Craig, Cooper-Bessemer Corp and C D Miller, Battelle Memorial Institute.*

The more important results from a two-year research program involving, it is believed, the first high-speed photographic records of events within a very large engine cylinder make up this paper. This cooperative research, by Cooper-Bessemer Corp and Battelle Memorial Institute, involved a Cooper-Bessemer GMV engine, a two-cycle, spark-ignited engine of 14-inch bore and 14-inch stroke, operating on natural gas. It is used widely for the pumping of natural gas through cross-country pipelines.

Schlieren photographs were taken of combustion, exhaust blowdown, scavenging, gas turbulence, and fuel injection, through large glass windows mounted at various positions in the cylinder head and cylinder wall. Slow-motion pictures made all of these phenomena clearly visible. Exact data were secured for all gas and flame velocities involved, as well as the crank-angles in these events.

The basic nature of flow of scavenging air through the cylinder volume in turbulent jets, which apparently cannot be circumvented, seemed the most valuable data obtained through this research program. *ASME Paper No. 53-S-45.*

Flame Temperatures in a Single Cylinder Spark-Ignition Engine. *By J H Potter and R B Dillaway, Univ of Illinois.*

Interest in flame temperature in the cylinders of internal combustion engines has brought to light many ingenious experimental techniques. Early workers used thermocouples or resistance thermometers of limited value because of thermal lag, mechanical instability, temperature damage and location.

In an electro-optical method worked out by Graff, radiation from alkaline salts in the working mixture in an engine-cylinder was focused on a photocell. The use of photographic filters narrowed the wave length band through which energy could be transmitted to the photocell. An amplifier and a cathode ray oscillograph were used, and the vertical deflection on the oscillograph pictures was calibrated in terms of temperature. This marked an important forward step as: 1) Individual cycles could be observed, 2) The whole cycle could be caught in a given photograph, 3) The maximum and minimum peak temperatures could be found, whereas the line reversal method gave an average of many cycles.

But the disadvantages of the Graff method were: 1) Difficulty in calibration, 2) Need for control of constancy of sodium concentration, 3) Relative complexity of the electronic equipment.

The present paper is built around experiments made on the engine generator set used by Hershey in which the Graff technique was employed. The

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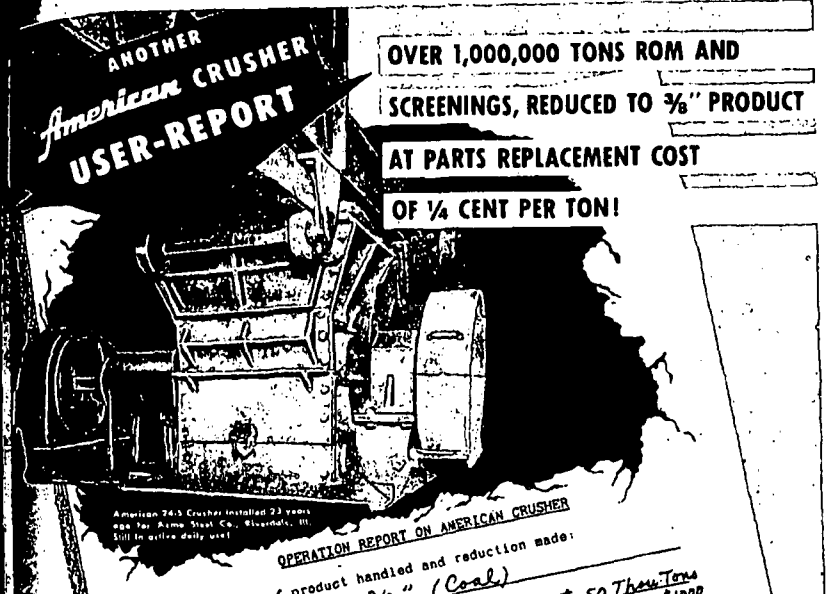
TO OBTAIN COMPLETE TEXT

Material for these abstracts comes from the following sources unless otherwise stated. Order complete paper from sources, not POWER.

American Society of Mechanical Engineers, Oil and Gas Power Div, annual conference, Hotel Schroeder, Milwaukee, Wis., May 25-28, 1953. Identified by initials ASME-OGP. Semiannual meeting, Statler Hotel, Los Angeles, Calif., June 28-July 2, 1953. Identified by initials ASME-S and obtainable through ASME, 29 W 39th St, New York 17, N. Y.

Air Pollution Control Assn, annual meeting, Lord Baltimore Hotel, Baltimore, Md., May 25-28, 1953. Identified by initials APCA and obtainable through R T Griebling, exec secy, APCA, 4400 Fifth Ave, Pittsburgh 13, Pa.



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Description of product handled and reduction made: Screenings to 3/8" (Coal)

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Estimate of annual Maintenance Labor on this crusher $500 to $1000 per year

We'd appreciate any comments you will give on the operation of this crusher It is a very satisfactory machine and has stood all the use and "ab-use" to which it was subjected.

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