Gas Engine Exhaust Temperature

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Pounder's Marine Diesel Engines and Gas Turbines Calculated A/F Ratio Exhaust Gas Temperature Measurement for Small Engine ControlCondensation of Water from Engine Exhaust for Airship BallastingPounder's Marine Diesel Engines and Gas Turbines

Since its first appearance in 1950, Pounder's Marine Diesel Engines has served seagoing engineers, students of the Certificates of Competency examinations and the marine engineering industry throughout the world. Each new edition has noted the changes in engine design and the influence of new technology and economic needs on the marine diesel engine. Now in its ninth edition, Pounder's retains the directness of approach and attention to essential detail that characterized its predecessors. There are new chapters on monitoring control and HiMSEN engines as well as information on developments in electronic-controlled fuel injection. It is fully updated to cover new legislation including that on emissions and provides details on enhancing overall efficiency and cutting CO2 emissions. After experience as a seagoing engineer with the British India Steam Navigation Company, Doug Woodyard held editorial positions with the Institution of Mechanical Engineers and the Institute of Marine Engineers. He subsequently edited The Motor Ship journal for eight years before becoming a freelance editor specializing in shipping, shipbuilding and marine engineering. He is currently technical editor of Marine Propulsion and Auxiliary Machinery, a contributing editor to Speed at Sea, Shipping World and Shipbuilder and a technical press consultant to Rolls-Royce Commercial Marine. * Helps engineers to understand the latest

changes to marine diesel engineers * Careful organisation of the new edition enables readers to access the information they require * Brand new chapters focus on monitoring control systems and HiMSEN engines. * Over 270 high quality, clearly labelled illustrations and figures to aid understanding and help engineers quickly identify what they need to know.

Supercharging of Internal Combustion Engines

John Wiley & Sons

Natural gas internal combustion engines release over half of the fuel's energy as waste heat and emit pollution that harms human health and accelerates climate change. Enriching natural gas with hydrogen has been shown to mitigate these impacts by reducing emissions and increasing engine efficiency. Thermal energy in the exhaust gas from natural gas engines can be used to drive chemical reactions to reform a biomass-derived feedstock into a hydrogen-rich gas. This gas can be blended with the primary fuel to enhance combustion and displace some of the natural gas demand. Two types of chemical reformation processes, aqueous-phase reformation (APR) and vapor-phase reformation (VPR), have been identified which can convert a biomass-derived sugar feedstock solution into a hydrogen-rich gas by recovering waste heat from engine exhaust gas. VPR operates at higher temperatures than APR, which limits the amount of heat that can be transferred from the exhaust gas to the reaction temperature. This study used a thermodynamic pinch analysis to compare the performance of these two processes based on their respective process heat demands and the thermal energy available from engine exhaust gas to determine how many moles of feedstock can be reformed. The calculations were performed using specifications for eight natural gas engines with reactor conditions from fourteen APR and ten VPR experiments, using glycerol as a model compound.

The Predetermination of Favorable Exhaust Stack Lengths for Two-stroke Cycle Internal Combustion Engines Stanford University Calculated A/F Ratio Exhaust Gas Temperature Measurement for Small Engine ControlCondensation of Water from Engine Exhaust for Airship BallastingPounder's Marine Diesel Engines and Gas TurbinesButterworth-Heinemann

Modern Gas and Oil Engines Createspace Independent Publishing Platform

The project is focused on the development of an energy efficient aftertreatment system capable of reducing NOx and methane by 90% from lean-burn natural gas engines by applying active exhaust flow control. Compared to conventional passive flow-through reactors, the proposed scheme cuts supplemental energy by 50%-70%. The system consists of a Lean NOx Trap (LNT) system and an oxidation catalyst. Through alternating flow control, a major amount of engine exhaust flows through a large portion of the LNT system in the absorption mode, while a small amount of exhaust goes through a small portion of the LNT system in the regeneration or desulfurization mode. By periodically reversing the exhaust gas flow through the oxidation catalyst, a higher temperature profile is maintained in the catalyst bed resulting in greater efficiency of the oxidation catalyst at lower exhaust temperatures. The project involves conceptual design, theoretical analysis, computer simulation, prototype fabrication, and empirical studies. This report details the progress during the first twelve months of the project. The primary activities have been to develop the bench flow reactor system, develop the computer simulation and modeling of the reverse-flow oxidation catalyst, install the engine into the test cell, and begin design of the LNT system.

Exhaust-Gas Pressure and Temperature Survey of F404-Ge-400 Turbofan Engine Gulf Professional Publishing

This book provides an introduction to basic thermodynamic engine cycle simulations, and provides a substantial set of results. Key features includes comprehensive and detailed documentation of the mathematical foundations and solutions required for thermodynamic engine cycle simulations. The book includes a thorough presentation of results based on the second law of thermodynamics as well as results for advanced, high efficiency engines. Case studies that illustrate the use of engine cycle simulations are also provided.

Bachelor's Theses Springer Science & Business Media

There has been an enormous global research effort to alleviate the current and projected environmental consequences incurred by internal combustion (IC) engines, the dominant propulsion systems in ground vehicles. Two technologies have the potential to improve the efficiency and emissions of IC engines in the near future: variable valve actuation (VVA) and homogeneous charge compression ignition (HCCI). IC engines equipped with VVA systems are proven to show better performance by adjusting the valve lift and timing appropriately. An electro-hydraulic valve system (EHVS) is a type of VVA system that possesses full flexibility, i.e., the ability to change the valve lift and timing independently and continuously, making it an ideal rapid prototyping tool in a research environment. Unfortunately, an EHVS typically shows a significant response time delay that limits the achievable closed-loop bandwidth and, as a result, shows poor tracking performance. In this thesis, a control framework that includes system identification, feedback control design, and repetitive control design is presented. The combined control law shows excellent performance with a root-mean-square tracking error below 40 [Mu]m over a maximum valve lift of 4 mm. A stability analysis is also provided to show that the mean tracking error converges to zero asymptotically with the combined control law. HCCI, the other technology presented in this thesis, is a combustion strategy initiated by compressing a homogeneous air-fuel mixture to auto-ignition, therefore, ignition occurs at multiple points inside the cylinder without noticeable flame propagation. The result is rapid combustion with low peak in-cylinder temperature, which gives HCCI improved efficiency and reduces NOx formation. To initiate HCCI with a typical compression ratio, the sensible energy of the mixture needs to be high compared to a spark ignited (SI) strategy. One approach to achieve this, called recompression HCCI, is by closing the exhaust valve early to trap a portion of the exhaust gas in the cylinder. Unlike a SI or Diesel strategy, HCCI lacks an explicit combustion trigger, as autoignition is governed by chemical kinetics. Therefore, the thermo-chemical conditions of the air-fuel mixture need to be carefully controlled for HCCI to occur at the desired timing. Compounding this challenge in recompression HCCI is the re-utilization of the exhaust gas which creates cycle-to-cycle coupling. Furthermore, the coupling characteristics can change drastically around different operating points, making combustion timing control difficult across a wide range of conditions. In this thesis, a graphical analysis examines the in-cylinder temperature dynamics of recompression HCCI and reveals three qualitative types of temperature dynamics. With this insight, a switching linear model is formulated by combining three linear models: one for each of the three types of temperature dynamics. A switching controller that is composed of three local linear feedback controllers can then be designed based on the switching model. This switching model/control formulation is tested on an experimental HCCI testbed and shows good performance in controlling the combustion timing across a wide range. A semi-definite program is formulated to find a Lyapunov function for the switching model/control framework and shows that it is stable. As HCCI is dictated by the in-cylinder thermo-chemical conditions, there are further concerns about the robustness of HCCI, i.e., the boundedness of the thermo-chemical conditions with uncertainty existing in the ambient conditions and in the engine's own characteristics due to aging. To assess HCCI's robustness, this thesis presents a linear parameter varying (LPV) model that captures the dynamics of recompression HCCI and possesses an elegant model structure that is more amenable to analysis. Based on this model, a recursive algorithm using convex optimization is formulated to generate analytical statements about the boundedness of the in-cylinder thermo-chemical conditions. The bounds generated by the algorithm are also shown to relate well to the data from the experimental testbed.

Elevated Exhaust Temperature, Zoned, Electrically-heated Particulate Matter Filter

Springer Nature

A thermocouple was installed in the crown of a sodium-cooled exhaust valve. The valve was then tested in an air-cooled engine cylinder and valve temperatures under various engine operating conditions were determined. A temperature of 1337 degrees F was observed at a fuel-air ratio of 0.064, a brake mean effective pressure of 179 pounds per square inch, and an engine speed of 2000 rpm. Fuel-air ratio was found to have a large influence on valve temperature, but cooling-air pressure and variation in spark advance had little effect. An increase in engine power by change of speed or mean effective pressure increased the valve temperature. It was found that the temperature of the rear spark-plug bushing was not a satisfactory indication of the temperature of the exhaust valve.

An Introduction to Thermodynamic Cycle Simulations *for Internal Combustion Engines*

A system includes an electrical heater and a particulate matter (PM) filter that is arranged one of adjacent to and in contact with the electrical heater. A control module selectively increases an exhaust gas temperature of an engine to a first temperature and that initiates regeneration of the PM filter using the electrical heater while the exhaust gas temperature is above the first temperature. The first temperature is greater than a maximum exhaust gas temperature at the PM filter during non-regeneration operation and is less than an oxidation temperature of the PM.

Working Details of a Gas Engine Test

This handbook deals with the vast subject of thermal management of engines and vehicles by applying the state of the art research to diesel and natural gas engines. The contributions from global experts focus on management, generation, and retention of heat in after-treatment and exhaust systems for light-off of NOx, PM, and PN catalysts during cold start and city cycles as well as operation at ultralow temperatures. This book will be of great interest to those in academia and industry involved in the design and development of advanced diesel and CNG engines satisfying the current and future emission standards.

Durability Investigation of a One-quarter of a One-quarter-sector Combustor at High Values of Inlet-air Pressure and Temperature

The exhaust from vehicles pollutes the environment and contributes to global warming, acid rain, smog, odors, respiratory and other health problem. This thesis aims to design a novel system of exhaust gas recirculation (EGR) system for diesel engine. A full system of EGR was built based on the design to reduce the exhaust temperature back to the combustion chamber in order to reduce the NOx emission. The new technique design consists of pipe, heat exchanger, valve and flow meter. The experiment used a diesel engine Mitsubishi 4D68 operated with diesel fuel and PME100 fuel. A gas analyzer was used to measure the emission level on the diesel engine. The experiment was conducted to identify the effect of the quantity of NOx emissions in diesel engine using EGR, new EGR and without EGR. The results of the emissions level on exhaust gas using EGR, new EGR and without EGR are compared. Result shows that NOx emission level using EGR is lower than using new EGR and without EGR. This is because the exhaust temperature is low when using EGR. The NOx concentration was reduced due to the decreasing exhaust temperature. The new EGR did not reduce enough exhaust temperature compared to the original EGR. However, compared to not using EGR, the new EGR still reduced the NOx emission. Finally, the study conforms to its objective where it provides a new and effective technique of EGR that reduces the NOx concentration in diesel exhaust. This study is conducted in order to design a new heat exchanger and a more effective cooling system made with different materials. The experiment was conducted using various type of fuel at difference engine RPM and engine loading.

Automobile Engineer

An exhaust-gas pressure and temperature survey of the General Electric F404-GE-400 turbofan engine was conducted in the altitude test facility of the NASA Lewis Propulsion System Laboratory. Traversals by a survey rake were made across the exhaust-nozzle exit to measure the pitot pressure and total temperature. Tests were performed at Mach 0.87 and a 24,000-ft altitude and at Mach 0.30 and a 30,000-ft altitude with various power settings from intermediate to maximum afterburning. Data yielded smooth pressure and temperature profiles with maximum jet temperatures approximately 1.4 in. inside the nozzle edge and maximum jet temperatures from 1 to 3 in. inside the edge. A low-pressure region located exactly at engine center was noted. The maximum temperature encountered was 3800 R. Walton, James T. and Burcham, Frank W., Jr. Armstrong Flight Research Center NASA-TM-88273, H-1375, NAS 1.15:88273 RTOP 533-02-08...

The Gas-engine

The objective of the project was to find an appropriate means for temporarily reducing the temperature of engine exhaust gases while holding to a minimum the infrared spectral emission in the reaction products at the exhaust temperature. The most promising approach appears to involve the injection of materials that undergo endothermic decomposition. Only limited data on endothermic decomposition were found in the literature. However, heat of decomposition values can be calculated from heat of formation data which is much more readily available. Some promising substances were tested by injecting their powders into a hot gas stream and measuring the temperature reduction thereby induced. Preliminary calculations based on these measurements indicate, typically, that engine exhaust temperature reductions of about 100F can be achieved for each 1 lb/sec of powder injected. The emission spectra of materials and their reaction products are also discussed. (Author).

A Practical Treatise on Modern Gas and Oil Engines

This award-winning book is

written for a variety of professionals: the expert and the beginner in the design office, members of a design team, the city engineer or chief engineer of a water or sewerage authority (or their subordinates) who may review plans and specifications, and manufacturers and their representatives who should know how their equipment will be used in practice. The depth of experience and expertise of the authors, contributors, and peers reviewing the content is unparalled. Pumping Station Design, 3rd is essential for professionals who will apply the fundamentals of various disciplines and subjects in order to produce a well-integrated pumping station which will be reliable, easy to operate and maintain, and free from design mistakes. Inappropriate design can be costly and there simply is no excuse for not taking expert advice from the pages of this book. An award-winning reference work that has become THE standard in the field; Dispenses expert information on how to produce a well-integrated pumping station that will be reliable, easy to operate and maintain, and free from design mistakes; Multi-contributed tome providing expert advice that has gone through a peer review process

This is a collection of theses completed to fulfill B.S. requirements in the College of Engineering, University of Wisconsin from 1895 to 1962.

Full-scale Altitude Engine Test of a Turbofan Exhaust-gas-forced Mixer to Reduce Thrust Specific Fuel Consumption

Gas, Gasoline and Oil Engines, Including Complete Gas Engine Glossary

Operating Temperatures of a Sodium-cooled Exhaust Valve as Measured by a Thermocouple

THERMAL LOADING AND WALL TEMPERATURES AS FUNCTIONS OF PERFORMANCE OF TURBOCHARGED COMPRESSION, IGNITION ENGINES

Effect of Exhaust Stack Length on Two Stroke Cycle Single Cylinder Diesel Engine

Gas Engine Troubles and Installation