

Engineering Student Technology Committee

<http://www.engr.colostate.edu/ESTC>

College of Engineering

Colorado State University

1. Title of Proposal: Thermal Sciences Lab Internal Combustion Engine Test Cell

2. Proposal Participants:

Primary Contact for Proposal

Name: Daniel Wise

E-Mail: dan.wise@colostate.edu

Department/Major: Mechanical Engineering

Check One: **Faculty** **Staff** **Student**

Additional proposal participants

Name: Kirk Evans

E-Mail: Kirk.Evans@colostate.edu_

Department/Major: Powerhouse Energy Institute, Engines and Energy Conversion Lab

Check One: **Faculty** **Staff** **Student**

3. Proposal Abstract (limit to 100 words):

This proposal is to assemble and install an improved internal combustion engine test stand for use in the MECH 338 Thermal Sciences Lab.

4. Proposal Budget

Obtain and prep engine for the test cell: \$4,000

Obtain and prep dynamometer: \$6,000

Fabricate and assemble test stand: \$2,000
(Includes physical engine stand, cooling system, enclosure, etc.)

Controller and data acquisition system: \$6,000
(NI Compact RIO DAQ)

Proportional valve for dynamometers: \$1,000

Throttle Actuator: \$500

Load cell for dynamometer: \$500

Total: \$20,000

Dollar or percentage amount requested from ESTC: \$10,000

5. Full description of proposal:

This proposal is to assemble and install an improved internal combustion engine test stand for use in the MECH 338 Thermal Sciences Lab. An engine is potentially available (Daihatsu-Briggs) at the engines lab that would substantially increase the educational value of the IC engine experiment currently part of the thermal sciences lab curriculum. The current engine is a single cylinder, air cooled engine with virtually no instrumentation and limited demonstration/educational value. The proposed engine, a 3 cylinder, liquid cooled, 700 cc, 20 hp machine more appropriately reflects the complexity of multi-cylinder engine design. Its use would allow installation of complete instrumentation facilitating measurement, observation and analysis of the full range of engine performance and operational characteristics as a direct and germane application of fundamental thermodynamics concepts.

The test stand, auxiliary components, engine, controller, and instrumentation will be gathered and assembled with undergraduate student labor with supervisory oversight provided by faculty and staff.