

RICHARD J. LILL
3823 Celeste Lane
Naperville, IL. 60564
Ph: (630) 854-3038; E-mail: rlill@anl.gov

SUMMARY OF EXPERIENCE

More than thirty years of comprehensive experience in diesel engine design, development, emissions research, testing, and service. Extensive hands-on experiences in engine testing, test instrumentation, data acquisition, data reduction, design and development of service tools, and testing of air brake systems. Played a major role in establishing EMD's engine research facility at Argonne National Laboratory. Led EMD efforts at Argonne assisting in design, construction, and operations of single-cylinder H- and 710-engine facilities. Key responsibilities included development of test programs for prototype engine components applied to single-cylinder H engine, assisted utilization of the Argonne facility with regard to time, budgetary control, and allocation of project funds. Initiated and supported the development of a test bench to characterize the fuel sprays; which can help to optimize the nozzle tips, needle bounce, injection rate shaping, and the impact of in-use plugged tips.

EXPERIENCE

STA Engineering Assistant at Argonne National Laboratory 2009-Present

- ❖ Planned and developed a test cell containing a 6 cylinder diesel engine and a six cylinder natural gas fired engine on a dual ended dynamometer.
- ❖ Planned and developed a test cell for a microturbine.

Co-owner, R&R Custom Home Improvements, LLC 2003-2009

- ❖ Started company, completing major renovation and remodeling of residential and commercial markets, with emphasis on quality and excellence
- ❖ Experienced in all aspects of construction duties and responsibilities
- ❖ Maintained up-to-date knowledge of techniques and materials

Project Engineer, Program Coordinator for Engine Facility at Argonne 1996-2005

❖ *Single-Cylinder H-Engine Facility at Argonne*

Tier II Emissions Program

2001-2005

- Develop high- pressure advanced fuel injection delivery system for locomotive diesel engines.
- Demonstrated the application of Compact Membranes (a method to enrich intake air with more nitrogen) to reduce NO_x emissions.
- Tested a new high-pressure injection system and achieved emissions and fuel usage reductions.
- Tested dual-current injection pump hardware with new injection tips under various engine test conditions /configurations
- Led the measurements of piston temperatures for support of new piston crown analysis
- Developed a new emissions control method using late-cycle air injection to achieve simultaneous reduction of particulates and NO_x emissions
- Tested variable dynamic injection timing cam arrangement

Tier 0 and Tier I Emissions Programs

1999-2000

- Evaluated the effects of various nozzle tips with different engine test conditions and hardware configurations to achieve Tier 0/Tier I exhaust emissions targets
- Tested different piston crowns in combination with different nozzle tips and camshaft phasing.

- Evaluated the effects of injection timing and airbox temperature on emissions; correlated with multi-cylinder test data.
- Developed extensive emissions measurement capabilities
 - Arranged procurement and support installation of emissions bench, CAI and Sierra.
 - Supported installation of Win-600 for transient combustion data collection and analysis
 - Supported hardware/facility modifications for emissions measurements
 - Developed trouble shooting/maintenance and data reduction procedures.
- Developed hardware and instrumentation for measuring dynamic high-pressure fuel injection pressure.

Component Evaluations

1997-98

- Established complete and accurate measurement methods for piston and liner to assure design conformity before running.
- Identified piston/liner scuffing problem and supported activities to resolve it
 - Experimentally and analytically determined that jacket water flow rate and temperature were adequate and were NOT the cause of scuffing.
 - Determined that original bore was too tight and recommended to increase it.
 - Provided thermal expansion analysis and determined that the upper pilot clearance was inadequate. Subsequently, upper pilot clearance was increased and an O-ring was added for location.
 - Determined that oil flow rate was critical for piston cooling. Insufficient flow results in scuffing.
- Developed special tooling to center the power assembly in crankcase bore.

Project Management

1996-2005

- Developed work scope and arranged contract amendments
- Assisted Program Managers at EMD in utilization of facility time, budgetary control, and allocation of project funds
- Provided guidance on project's execution, testing, data transfer, and post processing.

Training

1996-2005

- Trained Argonne staff on assembly, hardware changes, testing, and maintenance of single-cylinder H-engine
- Trained Argonne staff on AVL Puma, data acquisition system
- Supported Argonne staff on calibration and maintenance of test instrumentation.

Installation of Single-Cylinder H-Engine Test Facility

1995-96

- Provided guidance to Argonne staff in identifying the hardware received from EMD
- Supported the reconstruction of engine assembly
- Supported the design and build of various sub-systems
- Assisted in engine-dyno assembly, and integration of all the sub-systems
- Designed air start system
- Supported the installation of all electrical matrices
- On-site coordination and guidance throughout the construction and installation phases
- Responsible for completing the installation of the project on time and on budget.

❖ Single-Cylinder 710 Engine Facility at Argonne

2001-2005

- Layout of the test facility while integrating with existing 1-H engine sub-systems and utilities
- Identify the location of a common control room, and support construction of control room
- Design and oversee building of engine, subsystems, controls, and test equipment.
- Support set-up and oversee testing of various test programs.

❖ **Fuel Spray Characterization Bench at Argonne**

2000-2005

- Established a program to support the development of a fuel spray bench at Argonne. The objective of the program is to capture time evolution of the spray, beginning and end of injection, depth of penetration, spray angle, and drop size distribution using high-speed photography and lasers.

Laboratory Technician, EMD, LaGrange

1993-95

- Responsible for testing variations of micro air brake system's hardware and software packages.
- Developed prototype micro air brake systems to replicate realistic rail conditions
- Developed automated test rigs for cycle testing of air brake components.
- Designed systems to mimic electronics of various railroads' air brake systems
- Integrated airbrake systems with EM2000 and Integrated Cab Electronics, ICE and support the product.

Laboratory Technician, EMD, LaGrange

1986-93

- Responsible for setup, test, and maintain single-cylinder (854 and HERO) research engines at Cell #9.
- Developed test instrumentation and upgraded AVL PUMA 3 to 4.

Test Laboratory Technician, EMD, LaGrange

1981-86

- Developed experimental test apparatuses to evaluate product longevity and environmental impact.
- Evaluated locomotive control software package operation and ensure product compatibility.

PATENTS

1. Electronically-controlled late cycle air injection to achieve simultaneous reduction of NO_x and particulates emissions from a diesel engine, US Patent No. **6,752,131, June 22, 2004**
2. Diesel injection igniter and method, US Patent No. **6,712,035, March 30, 2004**
3. Hybrid fuel injection system, US Patent filed, Application No. **20040031468, February 2004.**

RECOGNITION/AWARDS

1. "**Laboratory Director's Award**" from Argonne National Laboratory (1998)
2. "**Pacesetter Award**" from Argonne National Laboratory (1997)
3. "**Achievement Recognition Award**" from Electro-Motive Division, GM (1997)
4. "**Quality Recognition Award**" from Electro-Motive Division, GM (1996)
5. "**Quality Recognition Award**" from Electro-Motive Division, GM (1995)

EDUCATION

Extensive safety training, General Motors safety training classes

Completed extensive safety training, while working at Argonne as a Resident Associate

Major: **Electrical Engineering**

January 1980 – June 1981

Cleveland Institute of Electronics, Cleveland, OH

Major: **General Studies**

June 1978 – December 1979

College of DuPage, Glen Ellen, IL