TRANSPORTATION RESEARCH CENTER INC.

2015 Annual Report
Transportation Research Center Inc. (TRC Inc.) independently manages a transportation research and testing facility serving the needs of industries, governments, trade associations, and educational organizations worldwide. Transportation Research Center (the Center) is located near East Liberty, Ohio, approximately 40 miles northwest of Columbus. Because much of TRC Inc.'s work is proprietary, many projects are described in general terms. However, the information presented on the following pages will provide the extent of TRC Inc.'s capabilities.

**History**

The Center was developed by the State of Ohio as a transportation research and development proving ground with the purpose of encouraging motor vehicle research and development activities in Ohio. The Center began testing in 1974. In 1979, the State of Ohio's Transportation Research Board entered into a management agreement with The Ohio State University’s (University) College of Engineering to oversee the operations of the Center. In 1987, the Center was sold as part of an economic inducement to Honda of America Manufacturing, Inc. to build an automobile plant in Ohio. In order to ensure that the business of the Center could be preserved without violating the confidentiality of the Center’s customers, the University established Transportation Research Center Inc., a non-profit corporation. TRC Inc. is governed by a Board of Directors chaired by the University’s Dean of the College of Engineering.

**Mission Statement**

As a global independent provider of development, research and testing, TRC Inc. serves the mobility industry with a world-class facility, high-quality services and innovative solutions through collaboration and partnerships with academia, industry and government, while satisfying stakeholder expectations.

**Vision**

To be the global leader in mobility development, research and testing solutions.

**Quality**

We will strive to meet or exceed customer expectations.

**Environmental**

We will strive to protect the environment and assure safe and healthful working conditions.

**ISO 9001 and ISO 14001 Registered**

**ISO 17025 Accreditation**

---

**Equal Employment Opportunity**

It is the policy of TRC Inc. to provide equal opportunity in all areas of employment practices, without regard to race, color, religion, national origin, sex, age, disability, veteran status, or any other reason prohibited by law.
On behalf of our staff, I am pleased to present the Annual Report for Transportation Research Center Inc. (TRC Inc.) for Fiscal Year ended June 30, 2015.

I would like to thank Jeffrey Sprague for his leadership as Interim President, the whole TRC Inc. team’s efforts during the transition period, and most significantly, the support and loyalty from all our partners and customers.

In April of this year, I had the pleasure of joining the TRC Inc. team and The Ohio State University (OSU). I am delighted to be here and am impressed by the tremendous assets, support, and potential of TRC Inc.’s abounding opportunities.

Our goal is to be the center of choice for all of our customers, partners, employees, and investors. We are grateful when we are the number one choice; and, when we’re not, we recognize that as a challenge and call to action to be better—much better—and to strive to be the best in the world at what we do. We hold ourselves to the expectations that our mindsets, behaviors, and culture are always customer-focused, forward-looking, respectful, proactive, and growth-oriented.

I am looking forward to our journey together of Driving Toward a Great Future and when TRC Inc. is a place:

where our customers see us as the best place to test and validate their vehicles
where our customers are treated well and love to come here
where our partners see an opportunity for their growth and success
where our competitors see us as collaborators for win-win scenarios
where mobility research is advanced and talent is attracted to
where investors see us as a wise choice to prioritize their investments
where we are a magnet for the mobility industry
where people of all ages want to be for the personal growth opportunities we provide
where our team is unleashed to be all that we can be and more

We hope to influence the power of collaboration more than ever before. I believe there is virtually unlimited potential to leverage the vast capabilities of OSU, JobsOhio, Columbus2020, and our numerous customers and potential business collaboration partners, including those who may feel like competitors today.

We are restructuring our organization by investing in our people, our relationships, and our technical capabilities to better serve our customers and partners.

Thanks again for your support and vision of Driving Toward a Great Future together!

Mark-Tami Hotta
Introduction

During the past 40 years, Transportation Research Center Inc. (TRC Inc.) has gained a reputation as the world’s leading provider of vehicular testing services. We have maintained this reputation, not only because of the quality services we offer, but also because we view the challenges that each year brings as new and exciting opportunities for growth.

Since Transportation Research Center (The Center) began operations in 1974, new programs have been developed for customers in the areas of collision avoidance, energy absorption, fuel economy, emissions, durability, performance, noise, crash simulation, and crashworthiness (please refer to the timeline presented below for an overview of our progress). Test programs evaluate the performance of passenger cars, trucks, airplanes, tracked vehicles, off-road vehicles, recreational vehicles, buses, motorcycles, electric vehicles, and automotive components. TRC Inc. schedules and monitors all facilities, with primary importance placed on the safety and security of each customer.

TRC Inc. is continually improving and adapting to meet changing customer needs. To enhance the Center and TRC Inc.’s overall service offerings, new facilities have been designed to assist customers in developing safe and marketable products. To complement our new facilities, TRC Inc. is ISO 9001 and 14001 registered, and maintains a 17025 accreditation. These registrations and accreditations demonstrate TRC Inc.’s commitment to customers. We will continue to measure and improve the quality of the services we provide.

The following pages of this report are dedicated to describing each of TRC Inc.’s primary business areas - Durability and Dynamics Operations, Laboratory Operations, and Contract Services - including a brief review of each business unit’s activities and accomplishments during the past year.

From 1962 to 2015
Facilities, Equipment, & Operational Changes

Under the terms of our Management Agreement, Transportation Research Center Inc. (TRC Inc.) exclusively schedules the facilities and equipment of Transportation Research Center (The Center). In addition, TRC Inc. maintains the facilities and buildings, which include approximately 150 lane miles of improved and unimproved road surfaces and 328,000 square feet of building space. Annual extensive facility upgrades are made through maintenance and repair, procurement of equipment, and facility construction, based on customer survey feedback.

For Fiscal Year 2015, we allocated resources for repairs and upgrades of existing facilities to continue to meet customer demand.

TRC Inc. manages one of the largest and most diverse proving grounds in the world. The pavement assets at The Center have been designed and constructed to accommodate a variety of automotive and tire testing, and managing the pavements is a significant undertaking, given the diverse tolerances that are linked to the test responses. Although TRC Inc. customers define a large portion of pavement performance feedback, the pavements must also meet additional regulatory compliance performance requirements, including specific limits for texture and friction.

TRC Inc. has developed a Test Course Management Program (TCMP) with the assistance of The Transtec Group (Transtec), which is based in Austin, Texas. Transtec offers pavement engineering support services intended to complement the knowledge base of TRC Inc.’s facility management team. Transtec provides TRC Inc. with expert recommendations regarding construction, engineering and various pavement materials, and also provides pavement evaluation, testing and data analysis for regulatory compliance. TRC Inc. has completed its second year of utilizing Transtec, maturing TCMP and proving the program’s value with various means of updated data, field condition surveys, and pavement profiles and texture evaluations. TCMP has produced a pavement management database and a report that includes alternatives for capital improvements and facility maintenance (strategies), performance and cost considerations (budget analysis), and final recommendations. These two key outputs have assisted TRC Inc. to make improvements to pavement facilities.

Durability and Dynamics Operations upgrades included the resurfacing of the ISO Noise Pad, which is designed to meet ISO 10844 standards. At its last certification in 2014, the ISO Noise Pad was in compliance with ISO 10844:2011 and 10844:2014. However, the engineering assessment conducted with the recertification concluded that surface distortion is likely to continue, which is why the ISO Noise Pad was resurfaced in 2015.

Laboratory Operations received upgrades in both the Impact Laboratory and the Emissions Laboratory. The Impact Laboratory gained the calibration capability of a Hybrid III 10-year-old child dummy. The Emissions Laboratory upgraded the computer control system of the Test Cell 2 Horiba dynamometer, and set up a new engine test stand using a GM LHU engine in Test Cell 1.
The Organization

Durability & Dynamics Operations

Durability and Dynamics Operations (DDO) finished FY 2015 2% below budget and 1% behind revenue from Fiscal Year 2014. The majority of DDO testing involves powertrain, rough road, chassis, corrosion, and fuel additives. In addition, we conduct brake, skid truck correlation, and vehicle handling testing to FMVSS, SAE, and ASTM Standards. DDO maintains a 24-hour-a-day, seven-day-a-week operation for rapid, safe mileage accumulation.

The following table represents the percentage of business by industry classification for Fiscal Year 2015:

<table>
<thead>
<tr>
<th>Industry Classification</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Manufacturers</td>
<td>76%</td>
</tr>
<tr>
<td>Component Manufacturers</td>
<td>11%</td>
</tr>
<tr>
<td>Independent Labs</td>
<td>3%</td>
</tr>
<tr>
<td>Fuels &amp; Lubricants</td>
<td>5%</td>
</tr>
<tr>
<td>Government Organizations</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

Vehicle testing continues to change with updated technologies and rule making. TRC Inc.’s largest area of growth has been in Dynamic Testing. TRC Inc. has increased its DDO staff in the engineering department with the intent of growing its capacity for specialized testing, as well as expanding the driver training program.

In addition to the testing that TRC Inc. members perform, outside customers also perform various testing at The Center, a testament to the wide range of facilities offered. In a continued effort to ensure a safe environment at TRC Inc. for both employees and customers, TRC Inc. has implemented a new facility licensing process. This process will keep TRC Inc.’s resident customers abreast of any changes to the TRC Inc. Facility Operating Guidelines, and serve as a refresher to those who are light volume facility users.

TRC Inc. continues to communicate with customers from abroad, regarding upcoming testing. Currently, TRC Inc. actively works with customers from two continents on programs that will eventually lead to importing vehicles to the United States market.

DDO has benefited from the Laboratory Operations (LO) groups at TRC Inc., as many customers also utilize these facilities. TRC Inc.’s breadth of services has likely caused customers to choose TRC Inc. over competitors who do not offer services in more than one area.

While TRC Inc. fulfills customer needs by utilizing its various business areas, customers often request testing outside of The Center’s capabilities. TRC Inc. is working with The Ohio State University for Automotive Research to develop a strong connection between the two organizations, emerging a shared business when customer needs exceed the capabilities of either organization alone.

TRC Inc. is actively seeking more partnerships, such as that with OSU, to bridge gaps of customer needs and TRC Inc.’s capabilities.
Laboratory Operations

Laboratory Operations, which decreased 22% in revenues for Fiscal Year 2015, consists of both Impact Laboratory Operations and Emissions Laboratory Operations. Impact Laboratory Operations had a decrease both in crash testing and sled testing for Fiscal Year 2015. A total of 176 crash tests were conducted, which was a decrease of 19% from Fiscal Year 2014. Impact simulation testing on the HYGE sled totaled 83 tests, a decrease of 37% from Fiscal Year 2014. Additionally, the Emissions Laboratory Operations conducted a total of 288 tests in Fiscal Year 2015, which was an 11% increase in testing from Fiscal Year 2014.

The following table shows the distribution of business by industry classification for Fiscal Year 2015:

<table>
<thead>
<tr>
<th>Industry Classification</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Manufacturers</td>
<td>46%</td>
</tr>
<tr>
<td>Government Organizations</td>
<td>12%</td>
</tr>
<tr>
<td>Fuels &amp; Lubricants</td>
<td>25%</td>
</tr>
<tr>
<td>Component Manufacturers</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

The majority of the Impact Laboratory's crash work involved development and certification of automobiles and light trucks to meet occupant protection requirements established by the U.S. Federal and Canadian Motor Vehicle Safety Standards (FMVSS and CMVSS). The Impact Laboratory provided research and development of alternative-powered vehicles, and simulation testing for child safety seat crashworthiness.

The Emissions Laboratory has gained an increase in chassis exhaust emissions testing following changes Environmental Protection Agency (EPA) made to All Terrain Vehicle (ATV) and Utility Terrain Vehicle (UTV) regulations.

The Impact Laboratory dummy calibration (pictured Robert Benavides).

The new regulations replaced engine dyno testing with chassis dynamometer testing requirements. ATV and UTV manufacturers looked to outsource certification and production line testing instead of investing in chassis based test equipment.

In order to meet our customers' expectations by continuing to expand our capabilities and provide state-of-the-art test equipment, improvements were made in both the Impact Laboratory and the Emissions Laboratory. The Impact Laboratory broadened its scope for calibrating advanced crash test dummies and gained calibration capability for a Hybrid 3 10-year-old child dummy.

The Emissions Laboratory upgraded the computer control system of the Test Cell 2 Horiba dynamometer, an older piece of equipment that is mechanically sound and necessary for testing motorcycles, ATV's and UTV's weighting less than 500 Kg (1,102 lb.). A new engine test stand using a GM LHU engine has been setup in Test Cell 1. A new additive evaluation test standard to protect gasoline direct injection fuel systems is being developed around this engine. A second potential standard using a GM LE9 engine is in progress with the objective to replace the industry...
The Organization

Contract Services

The mission of Contract Services is to provide customers with high-quality engineering and technical support to improve the safety, quality, and competitiveness of their products.

Contract Services is comprised of technical personnel whose services are dedicated to specific customers on a full-time basis. Their work predominantly involves research and development testing, including vehicle components, crashworthiness, crash avoidance, biomechanics, research analysis and test device and procedure development. The personnel in these groups include engineering technicians, mechanical and electronics technicians, engineering assistants, photographers, research engineers and research scientists.

The staff holds memberships in professional societies, including the Society of Automotive Engineers (SAE), and plays major roles in various technical committees. Numerous technical papers were authored or co-authored by our personnel during the past year. These affiliations and publications bring recognition and industry exposure to Transportation Research Center Inc.

The following table describes the percentage of business by industry classification for Fiscal Year 2015:

<table>
<thead>
<tr>
<th>Industry Classification</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Organizations</td>
<td>57%</td>
</tr>
<tr>
<td>Vehicle Manufacturers</td>
<td>43%</td>
</tr>
</tbody>
</table>

FY 2015 revenues fell in line with budget expectations. For FY 2016, we are predicting flat revenues due to anticipated stable head count within the Contract Services Group.
Registrations & Accreditations

Quality Planning, Assurance, Improvement & Control

Company Registrations

ISO 9001 Registration

As part of Transportation Research Center Inc.’s (TRC Inc.) commitment to customer satisfaction and continual improvement, the organization renewed its registration to the ISO 9001:2008 Standard on January 7, 2012 (Certificate No. US004370-1). The ISO 9001 Standard is an international model for quality management systems. Organizations are required to identify and document best business practices, and to implement these practices to achieve consistent quality services to meet and exceed customer expectations.

TRC Inc. Quality Policy Statement:
We will strive to meet or exceed customer expectations.

Quality Principles:

1. Customer Focus: TRC Inc. is committed to ensuring that each employee understands who the customer is, what the customer expects, and how their processes support the delivery of customer services.
2. Continual Improvement: TRC Inc. is committed to continual improvement in TRC Inc.’s Management System by setting quality objectives and targets, and by evaluating our performance to those goals.
3. Compliance: TRC Inc. is committed to complying with all applicable statutory, regulatory, and customer requirements, as well as internal policies.
4. Communication & Understanding: TRC Inc. provides education and training to ensure understanding of the quality policy throughout the organization.

ISO 14001 Registration

TRC Inc. is registered to the ISO 14001:2004 Standard. The organization renewed its registration to the ISO 14001:2004 Standard on January 7, 2012 (Certificate No. US004371-1). The ISO 14001:2004 Standard is a model for environmental management systems and addresses the management of business activities impacting the environment. Although not required by the ISO 14001 Standard, TRC Inc. has incorporated health and safety into our environmental program.

TRC Inc.’s Environmental, Health & Safety (EH&S) Policy Statement:
We will strive to protect the environment and assure safe and healthful working conditions.

EH&S Principles:

1. TRC Inc. is committed to continual improvement in its environmental, health, and safety program by setting objectives and targets and by evaluating our performance to those goals.
2. TRC Inc. is committed to prevention of pollution by using processes and materials that prevent, reduce, or minimize pollution. This commitment includes recycling, control mechanisms, material substitution, and efficient use of resources.
3. TRC Inc. is committed to compliance with all applicable environmental, health, and safety regulations, laws, and other internal and external requirements.
4. TRC Inc. provides education and training to ensure understanding of the environmental, health, and safety policies throughout the organization.

Company Accreditations

ISO 17025 Accreditation

As part of our commitment to customer satisfaction and continual improvement, TRC Inc. has been granted the ISO/IEC 17025:2005 Accreditation from the Laboratory Accreditation Bureau to perform the following tests:

• Fuel Injector Fouling Initial Performance (SCPI)
• Intake Valve Stick (IVS)
• Automotive Spark-Ignition Engine Fuel for Electronic Port Fuel Injector Fouling (PFI)
• Vehicle Crash Testing for the Safety Performance Evaluation of Highway Features
• Vehicle Crash Testing of Perimeter Barriers
The Activities

Sponsorship Activities & Community Relations

Transportation Research Center Inc. (TRC Inc.) has renewed its sponsorship of the Automotive News PACE™ Award for the 14th year. PACE™ is the acronym for Premier Automotive Suppliers’ Contribution to Excellence. Now in its 22nd year, the PACE™ Award honors automotive suppliers who have embraced innovation or adapted and reinvented themselves to meet the demands of the OEM customer. This prestigious award sets the standard for innovation and excellence and has become a significant industry credential.

TRC Inc. is proud to announce its continued sponsorship for EcoCAR 3, a collegiate automotive engineering competition. The competition’s mission is to offer an unparalleled hands-on and real-world experience to educate the next generation of engineers. The competition challenges 16 universities across North America to rebuild the Chevrolet Camaro by incorporating alternative fuels to improve fuel efficiency and applying advanced vehicle technologies, while retaining the safety standards and iconic body design of the Camaro. Each university team has four years (2014-2018) to complete an advanced technological, energy-efficient and high performance model. TRC Inc. has entered its second year of sponsoring the four-year competition, allowing the use of its facilities.

Staff Activities / Community Service

TRC Inc. believes in maintaining its role as a good corporate citizen in the community. TRC Inc. provides financial support through payrolls, payroll taxes and local procurement of goods and services.

TRC Inc.’s “Partnership in Technology Scholarship” program provides $1,000 renewable college scholarships for high school seniors planning to major in a two- or four-year automotive-related field, as well as the opportunity for an internship at Transportation Research Center (The Center). One first-year student was added this year for a total of 4 students receiving this award in Fiscal Year 2015.

Good corporate citizenship includes protecting the environment. At The Center, we accomplish this by recycling paper, plastics, glass and metals. TRC Inc. participates in the Ohio Department of Transportation’s Adopt-a-Highway program and supports the Keep Logan County Beautiful Committee, an organization that encourages recycling and litter prevention.

Child safety is promoted through TRC Inc.’s Child Seat Awareness Program, which provides employee reimbursement for the purchase of child restraints and assists the community through child restraint donation programs administered by local health departments.

The following organizations have benefited this Fiscal Year from TRC Inc.’s Community Relations programs:

- Adopt-A-Highway
- American Association of University of Women
- American Red Cross
- Antioch Shriners
- Bellefontaine City Schools – Seatbelt Safety
- Discovery Riders
- Humane Society of Logan & Union Counties
- Keep Logan County Beautiful Committee
- Local Food Pantries
- Logan Acres
- Logan County Agricultural Society
- Logan County Cancer Society
- Logan County Education Foundation
- Logan County Fraternal Order of Police
- Mothers Against Drunk Driving (MADD)
- Multiple Sclerosis Association of America
- North Union Elementary
- Perry Township Events Committee
- Rushcreek Fire Department
- Special Olympics Ohio
- Suicide Prevention Coalition
- United Way

TRC Inc.’s scholarship winners and co-op students from left to right: Marlissa Sebring, Veronica Cruz, Erin Fogle, Blaine Ricketts, Patrick Kroenung, Isaac Luther. Pictured above from left to right: George Bittner, Jason Church, Roger Schroer, and Mark-Tami Hotta.
Governance

Board of Directors

Dr. David B. Williams
Dean of the College of Engineering
The Ohio State University
TRC Inc. Chairman of the Board

Mr. George J. Arnold
Business Development Director, H.R. Gray
TRC Inc. Vice Chairman of the Board

Mr. Geoffrey S. Chatas
Senior Vice President Business & Finance
The Ohio State University

Mr. Mark-Tami Hotta
Transportation Research Center Inc.
President and Chief Executive Officer

Mr. R. Michael Gray
University Controller
The Ohio State University

Mr. Kenny McDonald
Chief Economic Officer
Columbus 2020

Dr. Caroline C. Whitacre
Senior Vice President for Research
The Ohio State University

Officers

Mr. Jeffrey A. Sprague
TRC Inc. Chief Operating Officer
TRC Inc. Board Secretary

Mr. Shawn T. Ahern, CPA
TRC Inc. Vice President
TRC Inc. Treasurer of the Board

Mr. Milton J. Dunlop
TRC Inc. Senior Vice President

Mr. Ronald W. Burton
TRC Inc. Assistant Vice President

Mr. Richard E. Powers
TRC Inc. Assistant Vice President

Governance

Board Changes

Mr. George J. Arnold was reappointed to the Board on December 11, 2014 for a two-year term ending at the close of the annual meeting in December 2016. Mr. Jeffrey A. Sprague was appointed by the Board to serve as Interim President, effective July 1, 2014. Mr. Mark-Tami Hotta was appointed to the Board as President and Chief Executive Officer, effective April 13, 2015. Mr. Jeffrey A. Sprague was appointed Chief Operating Officer upon Mr. Hotta's appointment to President.

General Counsel

Mr. Christopher E. Hogan

Independent Auditors

PricewaterhouseCoopers LLP