

# RED RIVER COLLEGE VEHICLE TECHNOLOGY & ENERGY CENTER

## Applied Research Project Selection: “Student & Staff Centered”

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### ABSTRACT

Red River College has become an identifiable forerunner in applied research activities within the motive power field. With the focus upon development of technicians for the future, Red River College and its staff have been actively involved in the integration of applied research activities to enhance current curriculum content. Through selective project involvement, Red River College has seen the learning activity within the programs expand and more proactive thinkers return in subsequent apprenticeship training levels.

## 1. Introduction

There has been a conscious effort to structure an integrated approach to applied research activities within the various programs delivered within the Transportation Heavy Apprenticeship Trades division (THAT) of Red River College (RRC). This approach has allowed for the enhancement of learning opportunities for both students and staff that previously weren't available to them.

Beginning in 2006 THAT division of RRC; has been actively involved in applied research activities with the support of the Applied Research & Commercialization (AR&C) department of RRC and a wide variety of industry and government stakeholders. The division has been focused on three major themes of research activity.

- Cold Weather Testing
- Alternative Fuel Vehicles
- Emission Testing

Within these areas the division has been successfully able to expose both students and staff to new technologies and involve all parties in using the research as an active component of the student's studies and for staff development.

With a student centered approach to project selection, we have found that this selective process has had a major effect on the students ability to become better prepared for the technological change they will be exposed to when in industry. From the staff perspective, it has been found that the willingness to pursue expanded research activities internally has also grown such as that of the original bio-diesel project (fig. 1). Case in point; is the current

Bio-diesel reactor that is nearing completion and is a joint venture between five separate departments within the college (fig. 2). The interest has spilled beyond the divisions preverbal borders and has other areas of the college now seeking to become involved in applied research. As a group that is made up of technicians and technologies, the desire to expand ones knowledge base comes natural to most staff.



Fig. 1 Original bio-diesel reactor from Red Deer College



Fig. 2 New high capacity PLC equipped reactor (June 2013)

## 2. Discussion

Situated near the geographic center of North America, Manitoba has for many years played host to manufacturers when testing the performance of their vehicle in a region of extreme temperature ranges. With temperatures that will vary seasonally from +35°C to -35°C and at times beyond both of these values, the climate facilitates data acquisition that may not be achievable in a real world situation anywhere else.

As a result, the applied research that occurs here is very often focused on out three themes of research activity preferences. The College and THAT division has fast become a recognizable institution that provides opportunities for its students and industry partners (Mongeon, 2008).

The division has found that while cold weather has been the catalyst to bring in a project, most projects are based upon validating alternative fuels or propulsion systems. These two areas are closely tied to the fundamental business of the institutions training mandate. As such, the projects fit the criterion for project selection in almost every case. The projects we have been involved with or are currently involved with are varied. Our current list of applied research activities that have been completed or are in progress are as follows:

- EPA Certification for engine and induction system installation for Bus Transportation industry (2007 standards).
- Hydrogen Hybrid cold weather testing.
- Hydrogen production and distribution.
- Hydrogen Fuel Cell Bus project.
- PHEV conversion and service.
- Power Generation Unit assembly project for use in arctic environment.
- Electric bus battery assembly project.
- Electric bus battery design and assembly project.
- EPA Certification for engine and induction system installation for Bus Transportation industry (2010 standards).
- CNG cold weather testing and report submission for Transport Canada.
- Bio-diesel production and vehicle testing.
- Bio-diesel reactor design and commissioning

All of these projects have been well received by the students and staff with no shortage of volunteers to participate in almost every project. It is important to mention that many of these projects are done when

faculty are instructing with students (to enhance the learning) or in their non-contact period. When staff participates in their non-contact hours they do so on a purely voluntary basis.

## 3. Conclusions

With the numerous projects that the division has had the opportunity to be involved in, we have all gained a tremendous amount value from our participation. The support that the college administration, supporting departments such as AR&C, the Province of Manitoba, the Government of Canada and Industry stakeholders and participants from both Canada and abroad, have all given immeasurable opportunities to our students. The growth that the division has experienced to date is only to be out shadowed by our future growth potential. The applied research activity that we have been exposed to has had a major impact on the culture of the division and has become contagious. With the support of AR&C I would expect continued opportunities for our students and staff and future technicians.

## 4. Acknowledgements

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## 5. References

Mongeon, C. (2008). *High Value University-Industry Interactions: "A study of 20 interactions"*. Electronically published in Canada (ed. 1,20090909).