

# GUJARAT TECHNOLOGICAL UNIVERSITY



## Center for Infrastructure, Transportation and Water Management (CITWM)

www.gtupgcenters.edu.in

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## Research projects on Indian Railways related issues

During meeting with Honourable Vice Chancellor with Shri Gaurav Agarwal, Director, Railway Board, Ministry of Railways, Shri Gaurav Agarwal mentioned that Indian Railways had announced institution of 5 fellowships for research on Indian Railways related issues at M. Phil and Ph.D. level in the Universities. Detailed scheme and Fellowship programs being offered by Indian Railways can be found at

[http://www.indianrailways.gov.in/railwayboard/uploads/directorate/mgt\\_ser/training\\_circulars/2014/Fellowships\\_Universities.PDF](http://www.indianrailways.gov.in/railwayboard/uploads/directorate/mgt_ser/training_circulars/2014/Fellowships_Universities.PDF)

It is therefore informed to faculties and research scholars of GTU affiliated colleges to study below mentioned areas listed as FUTURISTIC RESEARCH AND DEVELOPMENT AREAS on Research Design & Standards Organization (RDSO) of Ministry of Indian Railways website ([http://www.rdsso.indianrailways.gov.in/view\\_section.jsp?lang=0&id=0,4,282](http://www.rdsso.indianrailways.gov.in/view_section.jsp?lang=0&id=0,4,282)) and encourage Research Scholars to take up research on following areas relevant to Indian Railways.

Directorate	Projects/Areas
<b>Motive Power</b>	1. Residual life analysis of crankshaft of the locomotive engine
	2. Development of Fuel Cell powered locomotive
	3. Development of direct drive traction motor
	4. Development of hybrid battery powered shunting locomotive
<b>Geo-Tech. Engg.</b>	1. Assessment of strength and strengthening of railway formation
	2. Construction of new railway formation for heavier axle load
	3. Study on stability of cuttings in railway track
	4. Application and design of Geo-synthetics and reinforced earth structures in Railway formation
	5. Design methodology for thickness of blanket based on type of soil, axel load, speed, GMT, track tolerances, maintenance level etc.
	6. Prevention of rock fall in cuttings including its detection by suitable warning system and mitigation techniques for failure of cuttings.
	7. Effect of seismic forces on embankment and design of embankment from seismic considerations.

<b>Testing</b>	1. Track simulator
	2. Test preparedness for testing at 300 kmph
	3. Contactless force/stress measurement
	4. Measurement of rail-wheel contact force through other than measuring wheel
	5. Capability to use Anthropomorphic Test Device (ATD) for secondary collision environment measurement
<b>Traffic</b>	1. Increasing throughput by reducing speed differential
	2. Running of Heavy Haul trains and required technology for upgradation/modification in the infrastructure
<b>Engine Development</b>	1.Reduction of emissions of 16, 12 and 6 cylinder ALCO engines as well as 4000 HP GM EMD-710 G3B diesel engines of Indian Railways as per International standards
	2. Upgradation of Horse Power and reduction in break specific fuel consumption of 12 cylinder ALCO 251C engine
	3. Upgradation of Horse Power and reduction in break specific fuel consumption of 6 cylinder ALCO 251C engine
	4. Reduction in lube to fuel oil ratio of 16 cylinder ALCO 251C engine to 0.5%
	5. Development of Electronic fuel injection system for GM EMD-710 G3B diesel engine.
<b>Psycho Technical</b>	1. Computer Aided Psychological Testing
	2. Human factors in railway accidents
<b>Electrical</b>	1. Control systems for propulsion control as well as train control - various standards and protocols used and their applications, distributed intelligence vs. centralized intelligence etc.
	2. Drive Systems for high speed drives (more than 3000 rpm) - Study of design and maintenance issues of traction motor, bearing, lubrication etc.
	3. Traction converters for high power locomotive application study of various designs, circuit configurations and topologies, selection of power devices, power capacitors, inductors etc. and their ratings.
<b>Power Supply &amp; EMU</b>	Development of pollution-free Fuel cell for replacing 4.5 kW alternators, RRU and battery in slow moving train to improve illumination and passenger comfort.
<b>Traction &amp; Installation</b>	1.Development of Unified Power Quality Controller (UPQC) for improving power factor and reducing harmonic distortion
	2.Development of traction transformer condition monitoring system
	3.Development of Lightning arrestor condition monitoring system.
	4.Development of Intelligent SCADA system for high density traffic systems having RTUs with independent decision capabilities, integration of protection system, high speed communication and enhanced human-machine interfaces.
	5.Laser based OHE Recording cum test car. Development of OHE recording cum test car for measurement of OHE parameters and non-contact measurement of OHE geometry under dynamic condition

Faculties working or interested in any of the above areas are requested to email their contact information along with area of Research to Mr. Naresh Jadeja, Dy. Director – GTU on [deputy\\_dir2@gtu.edu.in](mailto:deputy_dir2@gtu.edu.in) before 6<sup>th</sup> September, 2014. A meeting of faculties with interest in above areas will be called to form Research Group on Indian Railways under Research Center for Infrastructure, Transport and Water Management.

**I/C Registrar**