

CIRT VISION 2010

1.0 Executive Summary

1.1 CIRT vision is to build a tradition of innovation through application research across a range of technical and managerial disciplines related with public road transportation. CIRT will be a growing and financially sustainable institution. CIRT will strive to apply and create globally competitive technologies and managerial solutions **to serve public road transport industry.**

1.2 CIRT has created excellent facilities and expertise in testing laboratories and Management Development Centre. Given a right focus, CIRT has the potential to undertake technology and managerial application research activities focused on STUs.

1.3 Application Research is practically non-existing both in laboratories as well as in management development center. Cross-disciplinary activities are minimal. Strengthening of Research and Consulting Division through creation of STU oriented multi-disciplinary **Application Research Clusters** is proposed. Indigenous development of technology, its application in STUs and home-grown managerial and economic proposals to boost STU economy will find a new focus at CIRT. Four new Application Research Clusters are proposed: Centre for Futuristic Transport Technologies (CFTT) ; Centre for Transport Management (CTPM) ;

Centre for Bus Body Design and Engineering (CBBE) and Centre for Auto-component and Test rigs Design and Engineering (CATR). Details of projects to be taken up in these Application Research Clusters have been included.

For long-term research in the frontiers of technology development relevant to public transport industry, CIRT will make effort to establish or to participate in **Research Consortiums**.

Three major projects namely hybrid bus technology, ITS technologies and composite materials for bus body construction have been identified to be taken up through **consortium approach**.

1.4 An Application Research Advisory Council (**ARAC**) will be constituted by inviting **external experts** to guide the research activities of CIRT. RAC will also have **STU Senior Level Officers** to guide CIRT in taking over applied research activities relevant to public transportation. Wherever felt necessary, consultants will be invited for short-duration to boost the activities in Application Research Clusters.

1.5 Laboratory Infrastructure development funding largely depends on R&D cess fund. No funds are currently earmarked for research. CIRT has become self-supporting in recent years primarily due to

CMVR testing and MOSRT& H supported consultancy services. About 23% of CIRT income was also generated in the year 2004-05 through testing of samples and consultancy from private parties.

A part of income will be invested in CIRT Corpus Fund for ensuring long-term viability for the institution with the possibility of a matching grant from ASRTU.

A **Development Fund** for Application Research Clusters and their infrastructure will be created by investing the income generated by CIRT in this fund according to a proposed formula. Efforts to secure external grants will always be made irrespective of internal funding.

1.6 A **special award fund** to recognize excellent contribution of employees will be instituted.

Professional development of staff will be a priority. A special fund will be created for national/international training/conferences. A monthly external expert's lecture series will be started for the development of staff. Staff will be encouraged for higher studies and M.S. or Ph.D. by research will be worked out with institutions like IITs/IIMs/BITS/IISC.

A concept of **Academic Alliance**, similar to student-worker concept popular in German Industry, will be implemented where

students can work on CIRT projects. A suitable student internship (stipend) will be considered.

Social and cultural life at CIRT campus will be activated to attract new researchers to stay in campus.

- 1.7** Management Development Programmes will be rigorously reviewed along with STUs and value added courses with expertise drawn from Application Research Clusters and external resources will be introduced. Faculty efforts will be gainfully diverted to consultancies and application research. National level conferences will be organised.
- 1.8** Research Performance will be monitored through a systematic approach and will be an essential element of career advancement.
- 1.9** Some Indicators have been proposed to monitor the progress of CIRT expected to happen in years to come as a result of implementation of various initiatives proposed in this document.
- 1.10** Organisation re-structuring has been proposed through creation of cross-disciplinary Research Clusters.
- 1.11** CIRT VISION 2010 has been prepared through a systematic discussion with officers and staff of CIRT, understanding the research scenario at national and international levels and through discussions with peer groups.

1.12 Draft CIRT VISION 2010 was put up in the 118th Governing Council meeting for discussions and for approval in principle. The suggestions of GC have been incorporated in this final document.

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CIRT VISION 2010

1.0 Introduction

1.1 CIRT aims to be a national leader in applying and creating globally competitive technologies and managerial solutions for sustainable public road transportation in the country through excellence in application research, consultancy and testing.

1.2 Our vision is to build a tradition of innovation through application oriented research across a range of technical and managerial disciplines related with public road transportation. CIRT will be a growing and financially sustainable institution. CIRT will provide a vibrant, intellectual environment that will be satisfying and inculcating a sense of pride in our staff and faculty while associating with the plan and activities of CIRT.

2.0 Application Research Objectives

2.1 At present, CIRT is not focused on research but having created excellent testing capabilities in various laboratories and with excellent exposure of faculty/staff through various consultancy assignments, has the potential to undertake application research activities. By encouraging the conduct of research of highest quality and by supporting sufficient critical mass in areas of research strength, CIRT aims to address the **technology and**

managerial research areas in the domain of road transportation. Through sharing of such results, innovative ideas and skilled expertise, CIRT feels it can make a significant contribution to the development of public transport industry and allied industries in India and the neighbouring countries.

2.2 Development of relevant knowledge base through research and the effective knowledge transfer is vital to our industry's economic prosperity. Knowledge also plays a key role in equipping individuals with relevant insight to enable decision-making and creative problem-solving. While CIRT will help to transfer knowledge generated through application research efforts to various STUs and Government for policy decisions, CIRT also aims to provide right exposure to its staff which will equip them to be independent thinkers and to undertake innovative research thereby enhancing CIRT's future competitiveness in the global economy. This will involve multi-disciplinary collaborations and promoting research with a commercial application in a globally competitive environment.

3.0 Strategic CIRT Vision 2010

3.1 By 2010 CIRT will –

- (i) have established 8 inter-disciplinary technology and managerial **Application Research Clusters** that will be recognized for their core competence in addressing industry needs of public transportation.

(List in **Annexure – I** and details of proposed scope of activities in **Annexure – VI/1-8**).

- (ii) participate or initiate at least three national level **Consortium Research Projects** to indigenously develop advanced Transport-related technology with global competitiveness (List in **Annexure – II A**).
- (iii) Organise one national / international conference every year in focus areas of CIRT (**Annexure – II B**).

3.2 To achieve the Strategic Vision 2010, the following needs to be addressed: -

3.2.1 Research Funding

Broadening the application research base in CIRT to develop the understanding of application of commercially viable technologies in STUs is vital for long-term sustainability of CIRT. Seized with awareness of problems being faced by STUs, CIRT will work in these Application Research Clusters to develop home-grown technologies or managerial solutions to serve STUs. This will

however require increased level of research funding. Therefore a mechanism to internally generate research funding must be set in besides efforts to get external funding. A proposal on internal research funding mechanism is given at **Annexure – IV A & IV B**.

3.2.2 Building up Application Research Strength

(a) CIRT will enhance its application research performance by building on its current strengths of engineering and testing skills. In each of the application research clusters, besides the cross-disciplinary teams within CIRT, there will be an effort to establish mutually beneficial relationship with local, national and global research partners to strengthen research activities. A list of probable networking partnerships in each Research Cluster is identified in **Annexure – VI/1-8**. CIRT's interaction with academic Institutions and various other consulting organisations including retired experts and ex-employees of CIRT will be increased to achieve its research objectives.

(b) In each Application Research Cluster, efforts will be made to secure research grants as it is very obvious that world class research can only be supported by access to world-class infrastructure and facilities. Exposure of research staff through seminars, trainings will be an essential component in furthering the research activities within these clusters.

(c) Highly motivated research staff are necessary to fulfill the desired objectives. While job satisfaction and exposure to scientific community through networking play a very crucial role to motivate staff adequately, it is also very essential to provide proper compensation package commensurate with expertise and job-market realities. It is necessary to retain talented researchers through a combination of appropriate pay-scales, promotion and reward policies. Salaries should be set at appropriate levels which will attract and retain good researchers.

(d) A proposal to attract talent and to retain them is given in **Annexure – III.**

As CIRT seeks to encourage staff for undertaking consultancy, testing and research for commercial applications, it is proposed that after direct internal costs are recovered, a part of surplus income will be shared according to a formula as incentive to employees. This will build motivation to perform and make career with CIRT. A proposal is included in **Annexure – IV A & B.**

3.3 Managing Research Programmes

3.3.1 Application Research Advisory Council (ARAC) - A detailed planning process to identify long-term strategic research needs and to convert them into rolling five-year strategic plan will be set up. To ensure that faculties develop realistic research plans, it is felt necessary to create an Application Research Advisory Council (ARAC) consisting of external experts. A proposed structure for ARAC is placed in **Annexure – V**.

3.3.2 The Institutional Re-structuring to support research

In order to be conducive for research, it will be necessary to re-structure the organizational set-up at CIRT in the following manner:- (A proposal on re-structuring of organization is given in **Annexure –X**).

(i) **Research and Consulting Division (RCD)**

All Application Research Clusters will be part of a newly created RCD. Some of the research clusters especially those focused on engineering design will be part of Engineering Division due to strong links with laboratories

but will be under Research monitoring activities of RCD. The head of the division will be responsible for research related strategic planning and co-ordination of research budget, develop research alliances and partnerships and to secure research funding.

(ii) **Engineering Division (ED)**

ED will consist of all current and future laboratories of CIRT. The details of laboratories are at **Annexure VII**. Some of the Application Research Clusters related with design and engineering will be part of ED. Currently, following Application Research Clusters are proposed in ED.

- (a) Centre for Computer Aided Engineering (CCAЕ);
- (b) Centre for Auto-components & Test Rig Engineering
(CATR);
- (c) Centre for Bus Body Design and Engineering (CBDE)

The individual laboratories will also be part of Research Clusters through a cross-functional relationship. This division traditionally depends on R&D cess fund to create infrastructure facilities. Other resources of funding will be explored including the internal mechanism. Upgrading of these labs. will be a rolling plan based on contemporary needs and some futuristic planning has been included here .

Excellent facilities have been created in the area of tyre testing, polymer testing, battery testing and automotive lighting system. It is proposed to undertake application-oriented **research** in battery, tyres and lighting systems under the group on Auto-components Design and Engineering. **(Annexure – VI/8: CATR-II B, CATR-II T & CATR-II L).**

Support Services Division will encompass various other departments like Accounts department, Administration department, and Knowledge Centre. The activities of Library, Publication department and Computer Centre will be merged to establish Knowledge Centre. The new initiatives in these functional areas are given in **Annexure – IX.**

- (iii) An **Academic Alliance Centre** will be created where students will be provided research projects in line with CIRT objectives to work under joint supervisors from academics and CIRT. Student internship (stipend) will be introduced. A policy of preferred employment of such students with CIRT will be formulated. This will be based on the lines of Student Worker Concept followed in German Industry. Later this

center may work out the possibility of starting a professional course in transport management and other allied areas.

- (v) An **early career researchers development task force** will be set up as it is recognized that early career researchers play a very crucial role as generators of new knowledge and we should leave no stone unturned to retain them. We will formalise a scheme to fund staff professional development programmes such as special study programmes, travel grants, overseas conference programme, and provision to set-up research grants for new staff.

A rolling fund for staff development will be created for local and national trainings/seminars. Individuals will have option to choose training programmes within their budget including the possibilities of accumulating their share of training fund for an international programme. A monthly external experts lecture series for staff development will be taken up.

Academic alliance centre , researchers development task force will work closely with the coordinator of Management Development Programme under RCD for a synergetic effect.

4.0 Research Performance Monitoring

4.1 To assess the research performance, we believe that after a gestation period, the scale of research effort can be assessed through a criteria linked to research income/research funding although this cannot be treated as sole criteria across the board. Other parameters like publication, patents etc will also be good indicators.

4.2 Research Performance will be monitored through a formal review system. Performance will be assessed through publication/patent outputs, IPR income in the research cluster, securing of grants and funding for research. This will form the basis to promote and for granting special rewards. This will also be the basis of encouraging scientists to new research initiatives.

4.3 It is also proposed to establish some indicators to monitor the progress CIRT is expected to make by implementation of the various initiatives proposed in this Vision Document. Some suggestions are included in **Annexure – XI**.

5.0 Approval of Governing Council

The Draft CIRT VISION 2010 was placed before Governing Council in its 118th meeting for kind consideration, discussions and

approval in principle. The suggestions of GC have been incorporated in the final document.

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Application Research Clusters at CIRT

(Details in Annexure VI/1- 8)

Existing

- 1) Centre for Road Safety (CRS)
- 2) Centre for Transport Policy and Economics (CTPE)
- 3) Centre for Computer Aided Engineering (CCAЕ)
- 4) Centre for Management Development Programmes (CМDP)

Proposed

- 5) Centre for Transport Management (CTM)
- 6) Centre for Futuristic Transport Technologies (CFTT)
- 7) Centre for Bus Body Design and Engineering (CBDE)
- 8) Centre for Auto-components & Test Rig Engineering (CATR)

Some Issues

- (i) To start with each Research Cluster will have a minimum strength of three members – Research Leader + Research Fellow + Student Worker which may be reviewed as the activities grow.
- (ii) If needed, services of an external consultant for a limited period may be utilized to boost the activity.
- (iii) All expenses on account of consultants, student worker will be met from the internal research fund generated for research clusters.

Consortium Research Projects

CIRT will take initiatives in the following three areas to start Consortium Research Projects at national level. Otherwise also CIRT will start their own activities in these chosen areas through networking with other experts/organisations.

- (i) Development of Hybrid Bus technology
- (ii) ITS Application
- (iii) Composite materials for Bus Construction

New areas will be taken up in future based on need assessment by Director, CIRT.

CIRT will invite industry and academics to the consortium to participate in developing new technology. The contribution will be in the form of financial commitments as well as facility commitments. Each sub-activity will have a consortium champion under the overall leadership of CIRT. Product Engineering will be an area of research focus after technology is developed. Sharing of IPR among consortium partners will be an in-built feature of the consortium approach.

Conferences/Seminars – National and International

To fulfill the commitment of organizing one national and one international seminar every year, CIRT proposes to organize the following seminars. The scope and objectives of the seminar would be decided on the basis of the broad themes given in the table below:

Topic	2006	2007	2008	2009	2010
Issues in Road safety	√			√	
Best practices in management of STUs	√			√	
Information Technology & Intelligent transport systems	√		√		
Alternative fuels and Propulsion Technologies in Bus Industry	√	√			√
Fuel economy in STUs		√			
Bus design and new composite materials			√		
Urban Transportation		√			√
Bus corridors and urban bus technology			√		
Emerging engine technology		√		√	
Hybrid Bus Technology			√		√

Besides these, the brainstorming session with external participants in various areas of research focus in CIRT will be a regular feature in Application Research Clusters and Engineering Division.

Annexure – III

Proposal to attract and retain talent

- 1) CIRT should do away with contract for five years service. The employment should be offered on permanent basis at all levels. New Recruitments at CIRT will be made on an initial three year contract followed by regular appointment only after evaluation and recommendation by an expert committee.
- 2) Probation period should be reduced to one year maximum. In case of training period of one year, the probation period should be six months only. During training, consolidated salary will be offered and thereafter regular grades.
- 3) The bond of Rs. 1.5 lakh should be abolished.
- 4) In the case of Senior / Middle Level recruitment , wherever needed a provision for special pay will be offered, with the approval of GC from case to case basis.

- 5) A comprehensive review of job skills matching with staff qualification will be taken up. Job differentiation for diplomas and graduate engineers to be made, especially in the field of testing in various laboratories.
- 6) On job-training, exposure to Conference/seminars will be a focus area for new recruits and early career scientists. A separate fund and a task force will be created for the purpose.
- 7) A start-up research grant for new scientists to pursue their research interest in the chosen field of CIRT will be considered.
- 8) A profit sharing formula as described in Annexure IV A will be a definite boost in retaining people.
- 9) Participation of laboratory scientists in newly created inter-disciplinary research clusters will cater to fulfill their creative urge.
- 10) Drudgery of travel will be reduced by allowing special airfares which have come closer to train fares. This may be adopted in paid consultancy services across the board and for other cases on need based.
- 11) Networking with academic and other industry institutions on

CIRT projects will be formalized in each Research Cluster for advancement of individuals and their exposure to the world of research.

12) Through academic alliances, student will be encouraged to work on CIRT identified projects and suitable internship (stipends) will be provided. A policy for preferential employment of such students will be framed. The concept will be closer to student worker concept followed in German Industry.

13) There will be encouragement for acquiring higher education and also for research publications and Intellectual Property Rights (IPR). Proposal regarding Higher studies like MS or Ph.D by research will be worked out with institutions like IITs, IIMs, IISc, BITS etc. The staff taking advantage of this policy will execute a bond to serve CIRT for three years. A scheme will be formulated in this regard. Study leave/part-time study will be considered in line with university regulations.

14) CIRT residents' social and cultural group activity will be encouraged and hardships on account of schooling etc. will be taken care. Sunday Bus to city will be introduced. To encourage the stay on campus, children education allowance and award schemes will be introduced. A pre-Nursery / Primary school in CIRT premises will be started with some NGO who can

be given facilities and support to run the school. In essence, CIRT campus life will be enriched so that young scientists may choose to stay in the campus.

Annexure – IV A

CIRT's Internal Funding for Research and allied areas

Through various consultancies and component testing, CIRT has started earning profits by way of economizing the operations. This surplus income can be ploughed back in strengthening research activities. The following break-up for ploughing back these funds to initiate research activities is proposed:

Income will be computed in two heads –

- (A) from work assigned by ASRTU & MOSRT&H sources
- (B) from work assigned by private sources

Break-up for Utilisation of the Fund

- (i) CIRT corpus Fund = 100% of (A) + 70 % of (B)
(Reserves to be built-up)
- (ii) Motivation Incentive Fund * = 20% of (B)
- (iii) Career Advancement Fund ** = 10% of (B)

A typical distribution of 2005-06 Income using above distribution formula is given in **Annexure – IV B**.

*for distribution to all employees in proportion to their basic salaries to maintain a general motivation level and to retain people with the organization – extent of distribution at the discretion of Director including merger with (i). Alternatively, this may be contributed by CIRT management for employees' post retirement benefit.

**for trainings/seminars including International exposure.

Annexure – IV B

Break-up of Income generated during 2005-2006 (pre-audit account) and its distribution to various funds using proposed formula given in Annexure – IVA

Total Income during 2005-06 : Rs. 76.56 lakhs

From ASRTU/MOSRT&H (i.e. A) = Rs. 54.73 lakhs (71.49%)

From private source (i.e. B) = 21.83 lakhs (28.51%)

- (i) CIRT corpus Fund (Reserves to be built-up) = 100% of (A) + 70 % of (B)=Rs 70.01Lakhs
- (ii) Motivation Incentive Fund = 20% of (B)=Rs 4.366 Lakhs
- (iii) Career Advancement Fund = 10% of (B)=Rs 2.183 Lakhs

It is noted from above that very meager reserves funding is generated internally in CIRT during 2005-06. It is therefore proposed that ASRTU may consider contributing a matching amount for CIRT corpus fund till reserves are built up to, say 50 crores. Then the fund proposed at Sl. No. (i) may be totally diverted for internal funding for application research in various research clusters.

Application Research Advisory Council (ARAC)

- Following expertise areas are proposed:
1. Transport Management
 2. Road Safety
 3. ITS technologies
 4. Propulsion System (Hybrid)
 5. Energy/Alternate Fuels
 6. HD Engine Combustion Research
 7. Engineering
 8. Traffic
 9. Operations
 10. Finance Management
 11. MIS

RAC Meetings & Constitution:

- (i) At least two meeting of RAC will be held every year
- (ii) To & fro air travel and an honorarium per meeting will be paid to ARAC members (other than STU experts).
- (iii) ARAC constitution will be revised every two years for external experts and every year for STU experts. Director, CIRT will drop or include other expertise areas based on needs and select the experts – both external and STU members. The Director, CIRT, will chair the ARAC and the STUs will be represented by Senior Level Managers.

Details on Application Research Clusters in Research and Consultancy Division

Centre for Road Safety (CRS)

The Centre was established in the year 2000-2001 through the support of MOSRT & H. Some of the initiatives pursued in CRS include research project on computer based driving skill evaluation system, road safety research studies, road safety publications and road safety training. The application of RFID (Radio Frequency Identification) technique to evaluate driving skills without human intervention is hallmark of the innovative research done by this Centre.

Future Outlook

The center will specialize in risk analysis (including from fire and chemicals), accident investigation and will adopt a multi-disciplinary approach to safety related problems. The core objectives of research would be to serve strategic policy and decision-making process through research on road safety strategies, safety management, estimation of safety aspects of various measures and accident analysis.

The Centre will undertake the following activities :-

- (i) develop simulation software to undertake parameteric studies related to road safety.
- (ii) create a systematic methodology to analyse road accidents and will build typical case studies on road accidents including the photographs and other data collection from hospitals, transport dept. police dept. and insurance cos.

- (iii) create a mobile outreach laboratory to reach the road accident site in city of Pune to record the evidence of accidents for analysis for improvement in road safety from the data collected from the accident site and using computer simulation.
- (iv) develop the capabilities to re-construct the accident through data collection as in (iii) using a computer software internationally available or to develop it locally. A format will also be designed by which various STUs can send the accident data to this center for analysis and comments.
- (v) to establish the relationship between accident and injury by closely working with the accident trauma center of some renowned hospitals.
- (vi) Road safety audit in urban areas and highway networks.
- (vii) Design and development of driver training and testing systems, model driving training schools etc.
- (viii) Public private participation in road safety campaign and education.
- (ix) To create a transport museum/ organize transport related exhibitions at CIRT- to initiate on ITS in 2006-07.

Networking

Within CIRT - CCAE, CBDE, VCL (Vehicle Crash Lab)

External -

1. Professor Jack McLean, Centre for Automotive Safety Research, Adeliade, Australia
2. Professor Dinesh Mohan, TRIPP, IIT, Delhi
3. Lokmanya Hospital/Other NGOs
4. ESCI, Hyderabad
5. CRRI, New Delhi
- 6.TRL (U.K.)
7. Consultants

Centre for Transport Policy and Economics (CTPE)

The center was established in the year 2000-01 with the help of a corpus provided by the Ministry of Shipping, Road Transport & Highways. The objective of setting up the center was to conduct studies for evolving appropriate policy papers in the transport sector. In addition to Management Development Programmes, some of the research leads pursued by CTPE include pricing policies for urban transport, Guidelines for a Transport Regulatory Authority in India, Public Transportation Study for the State of Uttaranchal, System of Accreditation of Bus Body Builders, Updation of List of hazardous goods under CMVR etc.

Future outlook

The center will strive to establish itself as a center of excellence for studies on Transport Economics and Transport Policy issues. The center will undertake research assignments in the following areas:

- Regulatory aspects in transport sector
- Urban transport policy issues
- Urban infrastructure finance
- Subsidy and taxation issues in urban public transport
- Accident costing
- Feasibility studies for multi-modal transportation in urban areas.
- Public Private participation in transport infrastructure and services
- Cost benefit analysis of alternative fuels, pollution and congestion.

Networking

Internal: CTPM, CRS, CMDP

External: TRIPP, IIT Delhi; Universities, TRL UK, MoUD, ADB/WB, Consultants

Centre for Computer Aided Engineering (CCAЕ)

The Centre was created in the year 2003 for the application of Finite Element Analysis for development of bus chassis and bus body construction and their structural analysis. It has the following softwares - Unigraphics for CAD modeling, hypermesh for discretisation, MSC Patran, MSC Nastran, LS Dyna, Abaqus, ADAMS, STAR-CD, FE-Safe for Analysis.

Future Outlook

In future plans, the Centre will -

- (i) design and develop aerodynamic bus body constructions
- (ii) CFD analysis for design of combustion chambers for heavy duty diesel engines.
- (iii) design and develop the chassis and bus body made up of composite materials.
- (iv) development of transmission systems

The center will participate in a national research consortium for design of bus bodies using composite material in bus construction which CIRT will initiate with other collaborative partners . The Centre will also play a pivotal role in structural analysis and designing of hybrid bus chassis in another research consortium planned by CIRT.

Networking

- | | | |
|--------------------|---|---|
| <u>Within CIRT</u> | - | VCL, CBDE, CFTT |
| <u>External</u> | - | TCS, IIT, Madras
Composite Material Cos.
Magna Steyr, Austria,
FEV, Germany, Consultants |

Centre for Management Development Programmes (CMDP)

Conventionally, the center runs about 65 training courses every year primarily for STUs. However the participation from STUs in these programmes has tremendously gone down over the years.

Future Outlook

A critical review will be done to start value added training programmes by drawing faculty from various research clusters. Sincere efforts will be made to assess the training needs with active involvement of STUs and design programmes for maximum effectiveness. It would be our endeavor to ensure that the programmes get participation from appropriate level of officers. The marketing of programmes will be rigorously done to other interested groups also besides STUs. CIRT, if called upon, would also offer consultancy in STUs for setting –up their own training centers and work out specific modules for training of trainers in such centers.

Centre will also establish –

- (i) CIRT faculty development activities including the task force for the development of early career scientists;
- (ii) Academic alliance group - to encourage students to work on CIRT projects
- (iii) Feasibility of starting a Distance learning / MBA / Certificate course related to transportation with due recognition from AICTE and in collaboration with renowned institutions like IIT, IIM, BITS etc. or independently.

Networking

Within CIRT – Library, Publication, Computer Centre,
Business Development

External – Academic Institutes, Consultants and retired
personnel as faculty to programmes

Centre for Transport Management (CTM)

Since Transportation Planning, Engineering, and management is the area of core competence in CIRT, this center would be a major center for research and consultancy in the Institute. The center will take up research projects with a view to facilitate sustainable growth in the sector.

Future outlook

The center will have a holistic approach to transport management including the planning, engineering and marketing aspects. The center would develop urban transport planning and management as one of its major areas of core competence. The core objective of research would be to produce recommendations, which would provide a direction to the planning and operation of public transport services in the country.

The centre will undertake the following activities-

1. Conduct traffic and transportation planning and engineering studies for major cities in the country. These would inter- alia include:
 - Intersection improvement study
 - Simulation study for traffic flow in urban areas
 - Multi-modal transport system
 - Bus Corridors

2. Conduct studies on design and planning of road infrastructure for urban development/municipal authorities. These would include :
 - Planning and design of city roads and traffic related facilities
 - techno-economic feasibility study for road infrastructure to create modern bus depots and terminals, bus workshop. CIRT will collaborate with construction firms like L&T, and others to create a modular design for modern bus stands.
3. Adequacy assessment of public transport in selected cities and its relationship with ambient air quality.
4. Develop marketing strategies for public transport providers
5. Computerisation of bus depots/terminals and software applications in public transport.
6. Studies on Intelligent Transport Systems
7. Studies on emerging bus technologies and their feasibility

Networking

Within CIRT- CCAE, CBDE, CRS, CTPE

External - Ministry of Urban Development, TRIPP, IIT Delhi, IUT New Delhi, Consultants

Centre for Futuristic Transport Technologies (CFTT)

The Centre for Futuristic Transport Technologies will work on following three research areas -

- (i) Telematics and ITS technologies Research (CFTT-I)
- (ii) Propulsion technologies Research (CFTT –II)
- (iii) Engine, Energy and Environment Research (CFTT –III)

(i) **Telematics & ITS Research (CFTT-I)**

CIRT has recently done a research study in RFID (Radio Frequency Identification) technology to develop a Driving Skill Evaluation module and has developed a proprietary software. In view of this background and in line with our futuristic vision, creation of a separate division for research in telematics and ITS technologies is proposed. A demonstration centre for ITS will be created in CIRT during 2006-07.

This Application Research Cluster will work closely with CIRT's CTPM and CRS for ITS impact studies which will include the advantages offered by ITS to travellers, STUs and in controlling city traffic congestions. Transport economics and operating cost, quality of service - driving time and their predictability, traffic safety noise, emissions, energy consumption and passenger comfort will be studied.

Networking -

Within CIRT – CTPM, CRS

External - BMTC, TIFAC, VTT Finland, MIT, University of Berkley, USA,
Indian Software Cos., IIT Madras, Consultants

Propulsion Technologies Research (CFTT-II)

CIRT will work on development of hybrid bus through a consortium of research groups. TIFAC initiative of Co-operative Automotive Research (CAR) programme will be contacted for financial support in the research project of national interest.

Alternatively, CIRT will start its own initiative on development of component level approach aimed at finally arriving at hybrid bus technology.

In first phase of work, CIRT will develop a retrofit electric drive (RED) system to overcome loss of fuel during engine idling in urban traffic.

Networking –

Within CIRT – CCAE, CBDE, CATR-IIB

External – IIT, Delhi, TELCO, MNES, OIB, OEMs
Magna Steyr/FEV; Consultants

(iii) Engine, Energy and Environment Research (CFTT-III)

Centre will undertake research on various sources of alternate energy in the context of public transportation and for the benefit of STUs . This will include creating facilities for evaluation of liquid fuels and their reformulations including bio-diesel, water in diesel emulsions, gaseous fuel like CNG, LPG and hydrogen, use of chemicals / fuel additives for increasing fuel efficiency/reducing pollution and optimization of engines. The expertise and research projects will include fuel and engine R&D and evaluation of various exhaust after-treatment technologies.

Following projects will be started –

- 1) LPG based bus engine development for Southern States
- 2) Improvement in efficiency of CNG buses (HCCI concept)
- 3) Evaluation of fuel additives and fuel saving devices
- 4) Evaluation of exhaust after treatment devices

The center will also undertake air quality impact analysis studies in close collaboration with CTPM. Centre will be closely associated with CMVR 126 Certification work.

Following facilities will be created in phased manner –

- 1) Heavy Duty Engine Dynanometer facility
- 2) Chassis Dynanometer and emission facility
- 3) Engine Combustion Research facility
- 4) Air Quality Monitoring Mobile facility

Networking

Within CIRT – CFTT, CCAE, CTPM

External – VKA, Aachen Germany, IIT, Madras, IIT Delhi, PCRA, STUs, Consultants

Centre for Bus Body Design and Engineering (CBDE)

Center will focus on bus body research with emphasis on structural stability, aero dynamics and light weight materials and components.

Centre will undertake the following activities –

- 1) Design and prototype development and testing in vehicle structural lab and field trials.
- 2) Studies of energy conservation through improvements in aerodynamics, light weight materials.
- 3) Life cycle costing for the buses using alternate materials like composites.
- 4) Participate for accreditation of the bus body builders.
- 5) to develop the testing methodology and technology for the recycling of bus components; working in the area of safe disposal
- 6) develop expertise for testing bio-degradability of components
- 7) develop expertise in assessing the residual life of components with a view to extend their life.

Networking

Within CIRT – VCL, CCAE, Polymer Analysis Lab. (PAL)

External - Composite Material Manufactures
- STUs, Bus Body Builders, Recycling specialists, Consultants.

Centre for Auto-Component and Test Rig Engineering (CATR)

The Centre will work on two major activities:

- (i) Test Rig development
- (ii) Auto Component Research

(i) Test Rig development and fabrication (CATR-I)

With years of expertise in maintenance of test equipments and designing testing protocols, CIRT has reached a stage where we can plunge into special test rig fabrications. This group will take the services of expert instrumentation engineers and automation specialists to automate rig operation within CIRT and also develop modern rigs for other end users.

Following projects are planned –

- (i) Indigenous Development of Test Rigs in CFTT, CRS, various labs.
- (ii) Special Rigs - Tractive Force Device, I&M Modules etc.

Networking

Within CIRT – CFTT, CRS, Workshop, CCAE

External – Local firms, Consultants

(ii) Auto-components Research (CATR-II)

Under this Application Research Cluster, CIRT will undertake design and engineering for select auto-components for which excellent testing facilities have been created. At present, three components are identified:-

- Battery (CATR-II B)
- Tyre (CATR-II T)
- Lighting systems (CATR-II L)

Battery Research (CATR-II B)

Battery being consumable item in the buses, the research on long-life battery is necessary. There is need to develop eco-friendly battery with low maintenance or maintenance free. Maintenance aspects and life expectancy of the battery have been improved through technology shift from conventional hard rubber container batteries having PVC separators and lead antimony electrodes to polypropylene container batteries using glass mat separators and antimony calcium electrodes.

A true maintenance free battery have not come out as a reality. As CIRT is considering to participate in research consortium in hybrid technology battery will be an essential part of this development and will be of deep discharge type and high energy density. Similarly, urban driving cycle will demand very fast charge and discharge response of the batteries. CIRT has established ultra modern battery test facilities and has trained and knowledgeable manpower in battery testing with good interface with battery industry, automotive manufactures and renowned institutions and as such is well placed to take research in the area of batteries. Such projects will be taken up –

- 1) Maintenance free high energy intensity batteries and
- 2) High charge/discharge batteries for hybrid vehicle applications

The Centre will also develop expertise in testing of fuel cells as part of long term vision.

Networking

Within CIRT – Battery Lab, Polymer Lab.

External - Central Electro Chemical Institute, Karikudi, leading battery industries like Exide, Prestolite, automotive industries like Tata, Battery Society of India and IIT, Delhi.

Tyre Research(CATR-II T)

Tyres like battery are consumable items and also play a very crucial part in economic operation of STUs. Tyres also play a crucial role in road safety and accidents.

CIRT has created excellent and unique facilities for tyre testing. CIRT also has created excellent polymer analysis lab. Experts from both the labs. will collaborate to undertake tyre research for extended life. Tyre – road interaction for safety consideration and fuel economy as related to rolling resistance will be subjects of research.

Networking

Within CIRT – tyre Lab, Polymer Lab

External – Rubber technologists, tyre manufacturers

Lighting System Research(CATR-II L)

CIRT has already created a photometric laboratory having ultra modern test facilities in collaboration with LMT, Germany, and has unique calibration facilities. CIRT can easily start research activities in Automotive Lighting.

In India no light and light signaling industries has sophisticated capability to design the good lighting systems. India is developing as a major exporter of automotive components for complete world.

In this photometric laboratory all light and light signaling devices can be tested. CIRT already has CAD/CAE center to validate the designs of lights. CIRT's 3-dimensional measurement system can be used for the profile measurements.

Dedicated software for optics designs like – Ray Master etc. will be procured in CIRT.

Networking

Within CIRT : CCAE

External : VRDE, ARAI, ISLE, Industries like LUMAX, Philips, Osram, Hella, Magna Styer, consultants

Details on CIRT Laboratories

CIRT has over the years established:

(1) Tyre Laboratory

The Tyre laboratory was established in 1995 with the help of R & D cess fund provided by the Ministry of Heavy Industries and Public Enterprises (MoHI & PE). The Laboratory carries testing of automobile tyres, helicopter tyres and wheel rims. The major tests carried out for tyres are endurance test, High – speed test, breaking energy test etc. The Tyre Laboratory also carries out testing of wheel rims for tests such as radial fatigue test and cornering fatigue test etc.

Future Outlook

Tyre is one the item identified for research under the Centre for Auto component and Test Rig (CATR –II T). Tyre Laboratory will collaborate with the Polymer Analysis laboratory (PAL) to undertake tyre research for extended life. Tyre modeling activity in collaboration with Centre for Computer Aided Engineering (CCAЕ) will be carried out.

The following test facilities are planned to be established in coming years with funding under R & D Cess Fund: -

- Measurement system for tyre dynamic growth

- Tyre uniformity test facility for truck tyres
- Flat track system
- N.D.T. testing (X ray m/c)
- Sensor based Tyre Foot Print analysis system
- Force and moment test for truck tyres
- Augmentation of test facility for Tyre Endurance Test
- Up gradation of existing test facilities

A list of major existing test facilities is given at **Annexure-VIII A**.

2. Photometry Laboratory

The Photometry Laboratory was established in 2004 with the help of R & D cess fund provided by the Ministry of Heavy Industry and Public Enterprises (MoHI & PE). The Laboratory has state of the art photometry testing facilities from LMT, Germany . Testing of Light & Light Signaling devices such as Head lights, Tail Light, Direction Indicators, Brake/Stop, Reversing & roof lights, Reflex Reflectors , Advanced Warning Triangles etc is carried out . The major tests carried out are Photometry tests, which include luminous intensity at specified test points for light & light signaling devices.

Future Outlook

Lighting Systems is one the item identified for research under the Centre for Auto component and Test Rig Engineering (CATR –II L). Laboratory

will collaborate with CCAE to undertake design and evaluation of lighting devices.

The following test facilities are planned to be established in coming years with funding under R & D Cess Fund: -

- Measurement of UV radiation for halogen lamps used for headlight assemblies
- Photometric measurements for lamps used for license plates
- Light transmission and defusion measurement test facility for plastic lens used for headlights
- Augmentation of photo detectors for calibration of lamps for spectral response
- Laser based equipments for distance measurement

A list of major existing test facilities is given at **Annexure-VIII B**

3. Automobile Laboratory

The Automobile Laboratory is one of the early most Laboratories established in CIRT. Over the years the Laboratory has been developed multifold with establishment of various testing facilities. Key facilities among these are Material Test System (MTS, USA make) for fatigue, endurance and vibration testing of various critical auto components such as Leaf Spring Assembly, Clutch Discs etc and Heat Transfer Test Rig for Radiators. The Laboratory also carries testing of various other critical

auto components such as Piston & Piston Rings, Ball & Roller Bearings, Air/Oil/diesel Filters, Brake Linings and Diesel Tanks etc.

Future Outlook

Work on establishment of a dedicated Fatigue Test laboratory is under progress with the help of R & D cess fund provided by the Ministry of Heavy Industry and Public Enterprises (MoHI & PE).

The following test facilities are planned to be established in coming years with funding under R & D Cess Fund:-

- Fatigue test facilities with Multi Axis Simulation Table
- Test facility for plastic fuel tank ,pneumatic couplings & window retention test
- Brake Dynamometer Facility
- Wear test for Clutch Facing
 - Four Pulley Test Rig for Rib Type Fan Belt
 - Torque Measurement for Wheel Nut Spanner & Tommy Bar
 - Torque Measurement for Scissor Type Jack
 - Augmentation and Up-gradation of existing test facilities

A list of major existing test facilities is given at **Annexure-VIII C**

4. Electrical / Battery Laboratory

Electrical Laboratory is also one of the very early laboratories established in CIRT. Over the years various testing facilities in Automotive Electrical & Electronics has been established . Key facilities among these are Battery Test System (Bitrode , USA make), Electro Dynamic Vibration

Test System, Wiper Assembly & Wiper Motor Test Facility, Facility for testing of Automotive Bulbs , Switches, Dash Board Instruments, Auto Cables etc

Future Outlook

Battery is one the item identified for research under the Centre for Auto component and Test rig Engineering (CATR –II B). Projects on High Charge/discharge batteries for hybrid vehicle applications and Maintenance free high energy intensity battery will be taken up.

The following test facilities are planned to be established in coming years with funding under R & D Cess Fund: -

- Vibration test facility with higher g level and load carrying capacity of mounting table
- Augmentation of test facility for auto bulb and pressure gauges
- Upgradation of test facility for alternators
- Life test facility for lighting devices with non replaceable light sources

A list of major existing test facilities is given at **Annexure-VIII D**.

5. Metallurgical Laboratory

Key facilities in the lab are Metallurgical microscope, (Make: Leica, Germany), Stereo microscope (Make: Carl Zeiss, Germany) Brinell cum Vickers hardness tester (Make: Heckest, Germany), Universal tensile testing machine, (Make: MTS), Capacity 50 Ton, Talyrond 265 roundness tester,

Surface roughness tester (Make: Maher, Germany) and Profile projector (Make: Nikon, Japan)

The laboratory carries out metallurgical and mechanical testing of various auto components such as Propeller shaft assemblies, Clutch Cover assemblies, Water pump assemblies and Kits, Steering Components, Brake Drums, Piston & Piston Rings, Ball & Roller Bearings, Hubs and Housings etc.

Future Outlook

The laboratory plans to undertake microscopy testing for micro electronic industry and plans to establish test facility for non-destructive testing of auto components. Following test facilities are planned to be established in coming years with funding under R & D Cess Fund: -

- Ultrasonic Testing Machine
- X-ray defect Testing Machine
- Magnetic Crack Detector
- Electro Scanning Microscope Machine
- Ultrasonic Hardness Tester
- Digital Impact Testing Machine and
- Metal & Non Metal coating thickness measurement machine

A list of major existing test facilities is given at **Annexure-VIII E**

6. Polymer Analysis Laboratory

Although Rubber laboratory was established as early as 1970s, a fully integrated Polymer Analysis Laboratory was established in the year

2005. Polymer Analysis Laboratory carries out testing of various types of polymers / plastic / rubber products and its components for their static, dynamic, physical and chemical properties. Some of the key components tested are Tyre Tubes, Tyre Flaps, Rubber Glazing, Auto Rubber and Plastic Components etc.

Future Outlook

The laboratory will collaborate with Tyre Laboratory and Centre for Auto Components and Test Rig Engineering (CATR-II T) to undertake work on Tyre Research for extended life of Tyre. Following test facilities are planned to be established in coming years with funding under R & D Cess Fund: -

- Brookfield viscometer
- Taber Abraser for measurement of abrasion resistance for Plastics
- Goodyear Healey rebound pendulum for determination of impact resistance and penetration of rubber
- Mooney viscometer for testing of unvulcanised raw rubber
- Goodmich Flexometer for Rubber property fleet build up and flexing fatigue in compression
- Pyrolised GCMS
- Augmentation and up gradation of existing test facilities

A list of major existing test facilities is given at **Annexure-VIII F**

7. Chemical Laboratory

Chemical Laboratory was established in 1970s. The Laboratory is divided in Two Sections as Chemical Lab 1 and Chemical Lab 2. Chemical Lab 1 caters to the testing needs of chemical analysis of ferrous and non-ferrous metal as well as testing of petroleum based products such as engine oil, gear oil, grease and radiator coolant etc. Chemical Lab 2 carries out testing of Paints and Other body building materials such as Safety Glass, Plywood, Rexines and Seat Cushions etc. Key facilities at Chemical Lab 1 are Direct reading spectrometer, Atomic absorption spectrometer, U.V. visible spectrometer and Carbon sulphur determinator. Key facilities at Chemical lab 2 are Weather-O-Meters, Corrosion chamber, Glass testing facilities and salt chamber.

Future Outlook

Chemical Laboratory shall take up research project on Bio-fuel and its usage in industry. Test facilities planned in future are:

- Test facility for testing of low sulphur and ultra low sulphur diesel fuel,
- Equipment for evaporation loss of Lubricating Oil,
- Test facility for existent gum in fuel,

- Solar Simulation Chamber with metal halide lamp for testing of components such as dashboards, wheel covers, instrument panels and safety helmets.
- Augmentation and up gradation of test facility for radiator coolant, spectrometer for metal analysis, electrochemical analyzer for Cu based materials, for testing of Greases, salt spray chamber and foam cutting machine.

A list of major existing test facilities is given at **Annexure-VIII G**

(8) Vehicle Crash Laboratory (VCL)

CIRT has established Vehicle Crash Laboratory (VCL) with the help of R&D Cess fund provided by Ministry of Heavy Industries & Public Enterprises. The Laboratory undertakes vehicle crash related testing such as measurement of strength of a super-structure of the vehicle. The tests carried out are: wall strength, roof strength of roof of cabs, front impact strength, roll over test of complete vehicle, test for strength rear under run protection device and side under run protection device.

Future Outlook

The laboratory plans to undertake tests for high speed photography and also plans to undertake optimization of design of vehicle structure in collaboration with Centre for computer aided engineering.

A list of major existing test facilities is given at **Annexure-VIII H**

Annexure VIII

S.N.	Name of the Equipment (Major)
<u>A. Tyre Laboratory</u>	
01	Two station tyre endurance test machine (Make Akron, USA)
02	Universal tyre test machine (Make: Lang Germany)
03	Dynamic cornering fatigue test machine for wheel rim (Make MTS, USA)
04	Tyre Uniformity Test Machine for Passenger Cars (Make Akron, USA)
05	Impact test machine for wheel rim
06	Hydraulic pressure pump

<u>B. Photometry Laboratory</u>	
01	Photogoniometer with Colorimeter & Retro reflector System (LMT Make)
02	Integrating Spheres for measurement of Luminous Flux (LMT & Lab Sphere Make)
03	Light Transmission & Reflection measurement System
04	Colorimeter for fluorescent materials
05	Calibration Bench for Photo detectors

<u>C. Automobile Laboratory</u>	
01	MTS Hydraulic Test System
02	Lubricating oil filter test rig
03	Diesel filter test rig
04	Three pulley fan belt test rig
05	Air brake hose test rig
06	Fabrication integrity test rig
07	Air filter test rig
08	Mechanical & Hydraulic Jack test rig

09	Radiator hose/water hose test rig
10	Torque test rig
11	Oil seal test rig
12	Water pump test rig
13	Whip test rig for brake hoses
14	Radiator heat transfer test rig
15	Spin test rig
16	Pressure impulse test rig
17	Clutch plate assembly endurance test rig

D. Electrical Laboratory	
01	Battery test system – Bitrode USA Make , (Life cycle tester and high rate discharge tester)
02	Integrating spheres (0.5 m and 1.0m size)
03	Auto lamp life test rig
04	Electro-dynamic vibrator (vibration machine)
05	Wiper Motor Assembly & Wiper Arm Test Rig
06	Spark tester for cables
07	High voltage test rig
08	Torsion tester
09	Head light switch test rig
10	Switch test rig
11	Voltage regulator test rig

12	Speedometer test rig
13	Ammeter test rig
14	Water spray chamber
15	Dust chamber

E. Metallurgical Laboratory	
01	Metallurgical microscope(Make: Leica, Germany)
02	Metallurgical microscope(Make: Carl Zeiss, Germany)
03	Stereo microscope(Make: Carl Zeiss, Germany)
04	Brinell cum Vickers hardness tester (Make: Heckest, Germany)
05	Universal hardness tester(Make: AFFRI, Italy)
06	Rockwell hardness tester
07	Digital micro hardness tester (Make: Affri, Italy)
08	Micro Vickers hardness tester
09	Universal tensile testing machine, (Make: MTS), Capacity 50 Ton
10	Universal tensile testing machine, Capacity 20 ton
11	Impact tester
12	Talyrond 265 roundness tester
13	Surface roughness tester (Make: Maher, Germany)
14	Profile projector (Make: Nikon, Japan)
15	Height measuring equipment (Make: Trimos (Vertical 3), Swiss)

F. Polymer Analysis Laboratory	
01	Thermo gravimetric analyzer (TGA)
02	Fourier transform infrared spectrometer (FTIR)
03	Differential scanning calorimeter (DSC)
04	Moving Die Rheometer (MDR 2000)
05	Dynamic Mechanical Analyzer (DMA) with TMA Capabilities
06	Air Permeability Tester
07	Ozone chamber
08	Electronic Weighing Balance
09	Precision Automatic Hardness Tester
10	Abrasion testing machine (DIN Abrader)

G. Chemical Laboratory I	
01	Direct reading spectrometer
02	Atomic absorption spectrometer
03	U.V. visible spectrometer
04	Carbon sulphur determinator
05	Colour spectrometer (Colorimeter)
06	Circulative corrosion properties Apparatus
07	Flash point tester
08	Four ball EP tester
09	Grease worker
10	Roll stability tester
11	Bomb colorimeter
12	pH Meter
13	Karl Fischer apparatus
14	Drop point tester

Chemical Laboratory II	
01	Weather-O-Meter (Atlas make)
02	Flammability test equipment
03	Humidity chamber
04	Moisture analyzer
05	Heating oven
06	Test Rig for Hardness measurement for coir and foam
07	Coir flexing test rig
08	PU Foam shearing test rig
09	PVC flexing test rig test rig
10	Latex flexing test rig
11	Latex hardness tester
12	Haze meter
14	Impact resistance test apparatus
13	Head form impact test apparatus
14	Bend test rig for rear view mirror
15	Climate chamber
16	Corrosion cabinet

H. Vehicle Crash Laboratory	
01	Test Facility for Roll over test of complete vehicle
02	Rear Wall strength test facility
03	Test Facility for Frontal Impact Strength
04	Roof strength (Roof of Cab) test facility
05	Test Facility for measurement of strength of Rear Under Run Protection Device (RUPD) & Side Under Run Protection Device (SUPD)

SUPPORT SERVICES

Details on Activities & Future Outlook

1.0 STU Data Bank:

Data Bank of CIRT compiles and publishes the data on physical and financial performance of the STUs for information and guidance of the researchers, academicians, transport operators etc. Data Bank maintains time series and cross sectional data. Every year Data Bank publishes The Annual Performance Statistics of STUs. It also publishes Quarterly performance review of STUs in the Indian Journal Of Transport Management. Data Bank will collaborate with CRS and CTPE for related activities identified.

2.0 Knowledge Centre

The activities of library, publication department and Computer Centre will be brought under one administrative head and this grouping will be named as “Knowledge Centre”

2.1 Library

The library will start e-abstracting of various Journals which will be hosted through CIRT website. It will also closely work with computer center to create knowledge management portal to capture tacit knowledge. Library will also network with other similar centres for exchange of abstracts, information including e-procurement of scientific articles.

2.2 Publications Department

The Publications department in addition to boost its main activity of publishing Journal (IJTM) will also endeavor to become “Mouth Piece” of CIRT to project and promote CIRT’s brand image. To achieve this, following activities will be undertaken.

- (a) To establish rapport with journalists of newspapers and other media.
- (b) To develop network with Central and State Governments, Public Sector undertakings, Foreign agencies, to scout for newer business opportunities for CIRT.

- (c) To connect with foreign publications for expanding reciprocal exchange system.
- (d) To take up work of producing promotional material like short films about CIRT and its activities, special films about research clusters and laboratories. Promotion of CIRT activities and core competence will also be done through e-news letter, CIRT website.
- (e) To undertake Public Relation (PR) activity.

2.3 Computer Centre

The Computer Centre and the services provided to Scientists is not of contemporary level. In October 2005, we have just introduced Broadband based Internet at four places and connected some officers through net-working to provide better internet services.

Computer hardware will be upgraded and leased lines for internet will be set up. Optical fibre based net-working will be done. By 2010 all technical staff upto the level of Diploma holders and upto Assistant Supdts. will be provided Computers. A vigorous training programme in MS office for all staff will be taken up.

Computer Centre will also be responsible for all MIS and databank. All software related developments in various research clusters will be co-ordinated from computer center. Computer center will also be responsible for hosting website and co-ordinate with library for e-abstract subscribed services through website. Software based knowledge management is being adopted in forward looking organizations to capture tacit knowledge. Through an in-house effort or external help, computer department will start knowledge management in all earnest.

3.0 Technical Specifications

Formulation of ASRTU technical specifications is the main activity carried out by Technical Specifications. So far more than 400 ASRTU specifications have been formulated. CIRT Scientists undertake the work of formulation and revision of specifications by literature review of National/ International standards, discussions with OEMs on the basis of OE drawings and by reverse engineering. The specifications so formulated are reviewed and approved by Specification Sub Committee of ASRTU. These specifications are used by ASRTU /STUs for inviting tenders and procuring auto parts. The section takes active part in formulation of Automotive Industry Standards (AIS) and Indian Standards (IS).

The review of ASRTU specifications for performance/endurance tests for critical auto components is carried out. Failure analysis of auto components in lab tests vis a vis field reports are studied and findings are translated into revised specifications. The Workshops/Seminars for the items where the pass percentage in lab test is low are generally conducted. Revision of ASRTU specifications, if required, is carried out on the basis of recommendations /findings of such workshop/seminar.

4.0 Quality Systems

CIRT has been awarded the ISO 9001 and ISO 14001 certificates by TUV, Germany for the design and execution of training, research , consultancy and testing services. CIRT is accredited by National Accreditation Board for Testing & Calibration Laboratories (NABL) as per ISO/IEC 17025 for its testing facilities in the fields of Mechanical, Chemical, Electrical and Photometry.

5.0 Customer Service & Business Development :

Customer service receives samples for testing from STUs/ASRTU and private parties. It interacts with all the customers for their testing requirements, applicability of specification/s, test charges etc. It also interacts with all the laboratories of Engineering Division. Up gradation of existing Software/Hardware and Office automation is proposed. Business Development will explore the possibilities to venture in new market segments. OEMs & Auto components manufacturers will be targeted to increase share of private testing. Tapping of domestic & international markets will be undertaken.

6.0 Accounts Department

6.1 Today, nearly 80% of the CIRT's total income comes from testing charges, training fees and consultancy charges. Through proper analysis the focus will be redistributed on activities assuring more inflow of money.

- 6.2** Testing Charges: Our strategy would be as under:-
- (A) “Pay and Test” policy will be employed
 - (B) A “Debit Card” type of system will be introduced for major private customers wherein the customers would be depositing a corpus testing fund with CIRT and the testing charges would be appropriately debited from the corpus.
 - (C) Testing charges will be revised appropriately at least once in two years for STUs and every year for private parties.
- 6.3** Training Fees: Our strategy will be similar to 6.2
- 6.4** Consultancy: Cost to benefit ratio for every consultancy will be undertaken and methods will be suggested to cut down expenditure wherever possible. This analysis will also form the basis for new quotes.
- 6.5** The concept of “Project Costing” will be brought in to undertake a realistic cost to benefit analysis and every function in CIRT will work on the concept of “Profit Centre”.
- 6.6** Exploring financial opportunities from national/international funding agencies for infrastructure developments.
- 6.7** Exploring avenues for availing financial concessions such as subsidies, grants, tax holidays, tax concessions and availing insurance for critical assets.

7.0 Administrative Department

7.1 Personnel & General Administration

- (a) Personnel policy and rules and regulations of CIRT will be reviewed and streamlined to attract talent and retain them.
- (b) More vigorous and attractive welfare activities will be introduced to retain employees and to make their stay in campus comfortable.

The suggestions are given in **Annexure – III**

7.2 Security

CIRT has a long ribbon shaped land holding and the present perimeter security is rather improper. Following activities will be undertaken to upgrade:

- (a) Proper fencing for compound wall
- (b) Perimeter walkway and
- (c) Secured access control to all ERC Laboratories.
- (d) Enhanced fire fighting system in the entire CIRT Campus
- (e) Closed circuit TV monitoring security system

7.3 Horticulture

Since CIRT enjoys a verdant setting and fertile land, efforts will be made to achieve “Green CIRT” through following activities:

Apiculture, plantation of Jatropha trees which will help us undertake research on bio-diesel. Since we also have a lot of agricultural waste and food waste from our Dining Hall, biogas plant to cater to needs of energy in kitchen will be installed. Some research projects on biogas may also be initiated to address social community responsibility. Vermiculture on biodegradable waste will be started.

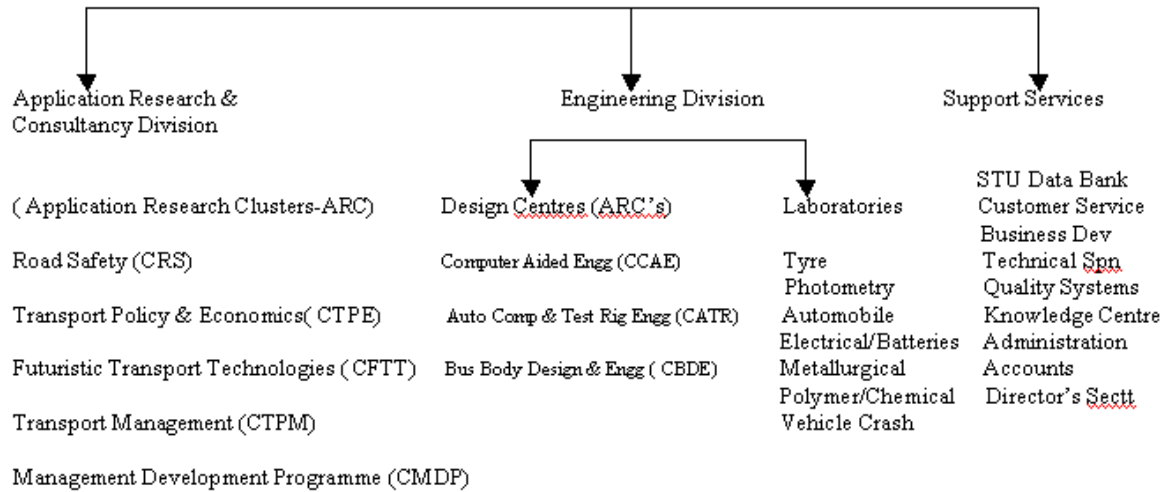
7.4 Hostel

Hostels are on the way of becoming a profit centre due to ever increasing use of MDC infrastructure. We propose to improve the upkeep of the hostel premises. Guest Rooms will be equipped with internet facilities and other modern amenities. We further propose to provide round the clock reception service for incoming guests.

Solar water heating system for residential quarters is also planned.

ORGANISATIONAL RESTRUCTURING

Central Institute of Road Transport



Annexure XI

Suggestive Indicators (to monitor CIRT progress as an outcome of full implementation of the initiatives proposed in CIRT VISION 2010).

By 2010, CIRT will achieve:

- (1) CIRT Revenue Surplus (Income – Expenditure) will reach a growth rate of 10% annum over 2003-04 data base despite the commitments at Sl.No. 2 below.
- (2) CIRT will generate enough surplus income to make capital investment from in house funds to a level of 20% growth every year over 2003-04 data base and to pay at least 20% of salary to its employees as motivating incentives for excellent work.
- (3) From a position of no patents technology license CIRT will achieve to develop technology to a level of at least 2 patents / license per annum.
- (4) CIRT will host of at least 2 national / international Conferences every year. At least 5 national and 2 international papers will be authored every year by CIRT.
- (5) From a position of practically no international exposure of researches in last 5 years, at least 10% of senior researches will get an international exposure ever year.
- (6) Student workers will find CIRT an enriching experience. At least 20 student workers every years will contribute on CIRT project.
- (7) CIRT campus life will be vibrant with 100% occupancy of senior level accommodation from current level of 30%.

List of Abbreviations

ADB	Asian Development Bank
AICTE	All India Council for Technical Education
ARC	Application Research Cluster
ARAC	Application Research Advisory Council
ASRTU	Association of State Road Transport Undertakings
BITS	Birla Institute of Technology & Science
BMTC	Bangalore Metropolitan Transport Corporation
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CAR	Co-operative Automotive Research
CBDE	Centre for Bus Body Design and Engineering (CIRT)
CC	Computer Centre (CIRT)
CCAE	Centre for Computer Aided Engineering (CIRT)
CFD	Computational Fluid Dynamics
CFTT	Centre for Futuristic Transport Technologies (CIRT)
CIRT	Central Institute of Road Transport
CMDP	Centre for Management Development Programmes (CIRT)
CMVR	Central Motor Vehicle Rules
CNG	Compressed Natural Gas
CRS	Centre for Road Safety (CIRT)
CTPE	Centre for Transport Policy and Economics (CIRT)
CTPM	Centre for Transport Management (CIRT)

ED	Engineering Division (CIRT)
ESCI	Engineering Staff College of India
FEV	German Engine Research Company
H ₂	Hydrogen
HCCI	Homogenous Charge Compression Ignition
IIM	Indian Institute of Management
IISc	Indian Institute of Sciences
IIT	Indian Institute of Technology
ITS	Intelligent Transport Systems
IUT	Institute of Urban Transport
LPG	Liquefied Petroleum Gas
LSTK	Lumpsum Turnkey
MIS	Management Information System
MIT	Massachusetts Institute of Technology
MNES	Ministry of Non-conventional Energy
MOSRT&H	Ministry of Shipping, Road Transport & Highways
MoUD	Ministry of Urban Development
OEMs	Original Equipment Manufacturers
OIDB	Oil Industry Development Board
PCRA	Petroleum Conservation and Research Association
PAL	Polymer Analysis Laboratory (CIRT)
PVC	Poly vinyl chloroflouride
RCD	Research and Consulting Division (CIRT)

RFID	Radio Frequency Identification
STUs	State Transport Undertakings
TCS	Tata Consultancy Services
TIFAC	Technology Information Forecasting and Assessment Council
TRIPP	Transport Research Injury Prevention Programme, IIT Delhi
TRL, U.K.	Transport Research Laboratory, United Kingdom
VCL	Vehicle Crash Laboratory (CIRT)
VKA	German Institute for IC engine research
VTT, Finland	Transport Institute of Finland
WB	World Bank