The Civil Engineer

NEWSLETTER

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The Institution of Civil Engineers (India)



From the Editor-in-Chief's Desk

Those who study in formal system have a different approach to life. They have primarily one role to play and that is that of a student. But all cannot seek entry to the formal system and enjoy Studentship. They adjust their careers as per the circumstances hoping that their dreams may come true one day. Nowadays there are plenty of opportunities available to satiate the hunger for learning. Whether one has obtained degree through formal system or otherwise the value remains the same as one is saddled with the same responsibilities. Engineering profession is a coveted profession and one has to play a very responsible role. Therefore the Engineers must develop certain traits to add color to their personality and to the profession they have chosen. The Engineer must have analytical aptitude and he must pay attention to the minutest details as the lives of the people are dependent upon the creation of the Engineer. He must have good communication skills as he has to interact with a lot of people from different background. Creativity and Logical thinking are other attributes to nurture by the Engineers. Apart from this, one must develop problem solving skills as many look up to him for solutions. Having mastery on the technical knowledge one should be able to work as a team player as most of the projects are the results of the team working together.

These are the basics and as one grows up in the workplace, one comes across a number of practical problems which no theory may think of or lay down. One must be positive and contributing to the excellent results for the benefit and satisfaction of all.

As usual this issue of the newsletter covers the positive role which the Transportation Engineers has to play. There is another article on "Engineering a paradigm shift" and one on "Indian Architecture". I am sure you will find them interesting and you will also enjoy other features of the newsletter with their updates.

My best wishes for your brilliant success in the examination.

Er. S.L. Swamy Chairman, ICE(I)

Fatigue is often caused not by work, but by worry, frustration and resentment. We rarely get tired when we are doing something interesting and exciting.



From the Editor's Pen

Now that the Summer Examinations are over one is in a relaxed mood and one feels less burdened till the results are announced. Thereafter preparation for Winter Examination would start with usual running about to do well in the next examination.

Leisure in life is important as it rejuvenates our energy. So far so good. But finding leisure at every step makes one lethargic and one looses the jest for life. Life is not just climbing the stairs or counting them. One has to enjoy each step, as each step is connected to the other and thus the journey of life goes on. There is no stage which should be taken as 'perfect' and assuming that there is one, then on reaching that point, the downward journey would start. Do we want such a stage of perfection?. The answer would be 'no'. The element of imperfection will keep the struggle going on and our struggle to march ahead. Road to the journey of life is not a straight one. There are hurdles and speed breakers which have to be crossed. One is not to be dismayed. One has to have faith in one's energies and resources and move fully charged. Here also a word of caution is there. While moving forward we have not to ignore the rights of others to move. We have to give space to others. That is what is adjustment and coexistence in a civilized society to which we belong to and where we live in. This principle of peaceful coexistence applies to both individuals and nations. The whole mankind is a big family. We have to respect and love each one. Our motto is to 'live and let live' then only this world would be a nice place to live in.

Prithipal Singh Secretary, ICE(I)

No legitimate businessman ever got started on the road to permanent success by any other means than that of hard and intelligent work, coupled with an earned credit plus character.

ENGINEERING A PARADIGM SHIFT

Civil engineering is the backbone of any civilization. Civil engineers plan, design and supervise the construction of facilities essential in modern life. Hence civil engineering is synonymous with the term 'infrastructural engineering' and it would not be an exaggeration say to that the level of infrastructural sophistication of any country resonates with the technical acumen and skills of its civil engineers. Given the close and almost inseparable proximity of this discipline with society it has managed to exude the multiple cross-currents of social, economic and political thought that prevailed in a particular society at a given time.

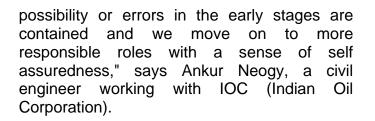
India has her own unique legacy with civil engineering. "Few people know that the term 'civil engineering' came into being because this branch had to be distinguished or separated engineering," from military says Saniav Dhande, director, IIT Kanpur. "The earliest assignments of civil engineers revolved around engineering guns and ammunition. But as the towns and cities of India started developing and more and more people started living in concrete shelters this branch of engineering acquired its own identity and focus," he adds.

Civil engineering today has five major subsets "Structural engineering, branches: or geotechnical engineering, water resources engineering, environmental engineering and transportation engineering are broadly the subsets," informs AK Gosain. head. department of civil engineering, IIT Delhi. Since its inception this branch of engineering has perhaps addressed the maximum number of challenges. These challenges are ingrained in mankind's quest for modernity, self identity and increased safety and convenience- all of which are perennial and continuously

changing. "Today the challenges are focused on ecology preservation, environmental sustainability, economic viability and inclusive social growth. Hence the five subsets are deepening their cross linkages with allied domains like geophysics, architecture, urban planning, materials science etc. In other words civil engineering is becoming increasingly interdisciplinary today," says Gosain.

Civil engineers have a profusion of avenues from where they can start their careers. "As a matter of fact of all the different fields of engineering, civil engineering jobs in India are faring better mainly due to the demands of improvement in the overall infrastructure of the country. Some of the obvious avenues span the public works departments of all state governments, real estate and construction companies, transport manufacturing firms and development urban and town planning agencies. In addition to these traditional domains. thev explore can career opportunities, especially as autonomous consultants, in various other fields where civil engineering has an interdisciplinary connect like for instance in the hydraulic industry and materials science industry," shares Gosain. "They also can join the lucrative Indian Engineering Services conducted by Union Public Service Commission and explore careers in research and teaching," he adds.

Civil engineering jobs particularly in India start on a low responsibility note. "The tasks become more and more responsible as we gather experience and demonstrate proficiency. Moreover, most civil engineers especially during the initial phases of their career are required to work in teams or in synchronisation with a lot of other engineers. This translates to an advantage as the



Civil engineers can always add on further qualifications. "But one primary requirement for all who aspire to be civil engineers is that they should have a strong background in mathematics and physical sciences," says Dhande.

Talking about some of the challenges faced by civil engineers in developing countries Dhande says, "Today countries like ours mirror asymmetrical development in terms of civic amenities. While the metropolitan cities are brimming in terms of both technological and design sophistication as far as these amenities are concerned the far flung rural and semi urban districts are disconcerting reminders of bygone eras. This is where the real renaissance or paradigm shift in civil engineering has to come."

According to Dhande civil engineers should innovate on their knowledge base to propose practical yet simple and economical solutions that can transform the civic amenities landscape of rural and semi urban India. "This is one of the pillars where the foundations of inclusive growth can rest," he observes. "They need to be engaged in creating infrastructure that checks social and regional imbalances." he sums up.

> Courtesy : Proyashi Barua, Times of India dated July 19, 2010.

INTRODUCTION TO TRANSPORTATION ENGINEERING

Overview

Mobility is a basic human need. From the times immemorial, everyone travels either for food or leisure. A closely associated need is the transport of raw materials to a manufacturing unit or finished goods for consumption. Transportation fulfills these basic needs of humanity. Transportation plays a major role in the development of the human civilization. For instance, one could easily observe the strong correlation between the evolution of human settlement and the proximity of transport facilities. Also, there is a strong correlation between the quality of transport facilities and standard of living, because of which society places a great expectation from transportation facilities. In other words, the solution to transportation problems must be analytically based, economically sound, socially credible, environmentally sensitive, practically acceptable and sustainable. Alternatively, the transportation solution should be safe, rapid, comfortable, convenient, economical, and eco friendly for both men and material.

Transportation system

In the last couple of decades transportation systems analysis has emerged as а recognized profession. More and more government organizations, universities. researchers, consultants, and private industrial groups around the world are becoming truly multi-modal in their orientation and are opting systematic approach to transportation а problems.

Diverse characteristics

The characteristics of transportation system that makes it diverse and complex are listed below:

1. Multi-modal: Covering all modes of transport; air, land, and sea for both passenger and freight.

- 2. Multi-sector: Encompassing the problems and viewpoints of government, private industry, and public.
- 3. Multi-problem: Ranging across a spectrum of issues that includes national and international policy, planning of regional system, the location and design of specific facilities, carrier management issues, and regulatory, institutional and financial policies.
- 4. Multi-objective: Aiming at national and regional economic development, urban development, environment quality, and social quality, as well as service to users and financial and economic feasibility.
- 5. Multi-disciplinary: Drawing on the theories and methods of engineering, economics, operations research, political science, psychology, other natural, and social sciences, management and law.

Study context

The context in which transportation system is studied is also very diverse and are mentioned below:

- 1. Planning range: Urban transportation planning, producing long range plans for 5-25 years for multimodal transportation systems in urban areas as well as short range programs of action for less than five years.
- 2. Passenger transport: Regional passenger transportation, dealing with inter-city passenger transport by air, rail, and highway and possible with new modes.



- 3. Freight transport: Routing and management, choice of different modes of rail and truck.
- 4. International transport: Issues such as containerization, inter-modal co-ordination.

Background: A changing world

The strong interrelationship and the interaction between transportation and the rest of the society especially in a rapidly changing world is significant to a transportation planner. Among them four critical dimensions of change in transportation system can be identified; which form the background to develop a right perspective.

- 1. Change in the demand: When the population, income, and land-use pattern changes, the pattern of demand changes; both in the amount and spatial distribution of that demand.
- 2. Changes in the technology: As an example, earlier, only two alternatives (bus transit and rail transit) were considered for urban transportation. But, now new systems like Metro Rail Transport systems etc offer a variety of alternatives.
- 3. Change in operational policy: Variety of policy options designed to improve the efficiency, such as incentive for carpooling, bus fare, road tolls etc.
- 4. Change in values of the public: Earlier all beneficiaries of a system was monolithically considered as users. Now, not one system can be beneficial to all, instead one must identify the target groups like rich, poor, young, work trip, leisure etc.

Role of transportation engineer

In spite of the diversity of problem types, institutional contexts and technical perspectives there is an underlying unity: a body of theory and set of basic principles to be utilized in every analysis of transportation systems. The core of this is the transportation system analysis approach. The focus of this is the interaction between the transportation and activity systems of region. This approach is to intervene, delicately and deliberately in the complex fabric of society to use transport effectively in coordination with other public and private actions to achieve the goals of that society. For this the analyst must have substantial understanding of the transportation Systems and their interaction with activity systems; which requires understanding of the basic theoretical concepts and available empirical knowledge.

Basic premise of a transportation

system

The first step in formulation of a system analysis of transportation system is to examine the scope of analytical work. The basic premise is the explicit treatment of the total transportation system of region and the interrelations between the transportation and socioeconomic context.

They can be stated as:

- 1. The total transportation system must be viewed as a single multi-modal system.
- 2. Considerations of transportation system cannot be separated from considerations of social, economic, and political system of the region.

This follows the following steps for the analysis of transportation system:

- 1. Consider all modes of transportation
- 2. Consider all elements of transportation like persons, goods, carriers (vehicles), paths in the network facilities in which vehicles are going, the terminal, etc.
- 3. Consider all movements of passengers and goods.
- 4. Consider the total trip for every passenger over all modes and facilities.



As an example, consider the study of intra-city passenger transport in metro cities.

- 1. Consider all modes: i.e. rail, road, buses, private automobiles, trucks, new modes like Metro Rail Transport systems etc
- 2. Consider all elements like direct and indirect links, vehicles that can operate terminals, transfer points, intra-city transit like taxis, autos, and urban transit.
- 3. Consider diverse pattern of O-D of passenger and goods.
- 4. Consider service provided for access, egress, transfer points and mid-block travel etc.

Once all these components are identified, the planner can focus on elements that are of real concern.

Major disciplines of Transportation.

- 1. Public transportation or mass transportation deals with study of the transportation system that meets the travel need of several people by sharing a vehicle. Generally this focuses on the urban travel by bus and rail transit. The major topics include characteristics of various modes; planning, management and operations; and policies for promoting public transportation.
- 2. Financial and economic analysis Transportation facilities require large capital investments. Therefore it is imperative that whoever invests money should get the returns. When government invests in transportation, its objective is not often monetary returns; but social benefits. The economic analysis of transportation project tries to quantify the economic benefit which includes saving in travel time, fuel consumption, etc. This will help the planner in evaluating various projects and to optimally allocate funds. On the

contrary, private sector investments require monetary profits from the projects. Financial evaluation tries to quantify the return from a project.

- 3. Environmental impact assessment The and depletion of fossil fuels the degradation of the environment has been a severe concern of the planners in the past few decades. Transportation; in spite of its benefits to the society is a major contributor to the above concern. The environmental impact assessment attempts in quantifying the environmental impacts and tries to evolve strategies for the mitigation and reduction of the impact due to both construction and operation. impacts The primary are fuel consumption, air pollution, and noise pollution.
- 4. Accident analysis and reduction one of the silent killers of humanity is transportation. Several Statistics evaluates that more people are killed due to transportation than great wars and natural disasters. This discipline of transportation looks at the causes of accidents, from the perspective of human, road, and vehicle and formulates plans for the reduction.
- 5. Intelligent transport system with advent to computers, communication, and vehicle technology, it is possible in these days to operate transportation system much effectively with significant reduction in the adverse impacts of transportation. Intelligent transportation system offers better mobility, efficiency, and safety with the help of the state-of-the-art-technology.

In addition disciplines specific to various models are also common. This includes railway engineering, port and harbor engineering, and airport engineering.

(Source : Internet)

INDIAN ARCHITECTURE



One of the most enduring achievements of Indian civilization is undoubtedly its architecture. Indian architecture, which has evolved through centuries, is the result of socio-economic and geographical conditions. Different types of Indian architectural styles include a mass of expressions over space and time, transformed by the forces of history considered unique to India. As a result of vast diversities, a vast range of architectural specimens have evolved, retaining a certain amount of continuity across history.

Indian architecture, belonging to different periods of history, bears the stamp of respective periods. Though the cities of Indus provide substantial evidence Vallev of extensive town planning, the beginnings of Indian architecture can be traced back to the advent of Buddhism in India. It was in this period that a large number of magnificent buildings came up. Some of the highlights of Buddhist art and architecture are the Great Stupa at Sanchi and the rock-cut caves at Ajanta.

With the establishment of Hindu kingdoms in South India, the south Indian school of architecture began to flourish. The most notable achievements of the Pallava rulers were the rock-cut temples of Mahabalipuram and the temples of Kanchipuram. The Chola, Hoyasala and Vijayanagar rulers also did remarkable job in the field of architecture. The temples at Thanjavur, Belur and Halebid bear testimony to the architectural excellence of the South Indian rulers.

In north India, there developed a new but different style of architecture. This was called as the Nagara style architecture. In central India, the Chandela rulers built a magnificent temple complex at Khajuraho. With the coming of the Muslim rulers, there developed a new architectural style in India- the Indo-Islamic architecture. The Indo-Islamic style was neither strictly Islamic nor strictly Hindu. The architecture of the medieval period can be divided into two main categories. They are the Delhi or the Imperial Style and the Mughal Architecture.

It was followed by a new style of architecture that developed as a result of colonization of India. This style of architecture came to be called as Indo-Saracenic. The Indo-Saracenic architecture combined the features of Hindu, Islamic and western elements. The colonial architecture exhibited itself through institutional, civic and utilitarian buildings such as post offices, railway stations, rest houses and government buildings.

Ancient Architecture

Indian architecture is as old as the history of the civilization. The earliest remains of recognizable building activity in the India dates back to the Indus Valley cities. Among India's ancient architectural remains, the most characteristic are the temples, Chaityas, Viharas, Stupas and other religious structures.

Indo Islamic Architecture

The medieval period saw great developments in the field of architecture. With the coming of Muslims to India, many new features came to be introduced in buildings. The development of Muslim Style of Architecture of this period can be called the Indo-Islamic Architecture or the Indian Architecture influenced by Islamic Art. The Indo-Islamic style was neither strictly Islamic nor strictly Hindu.

Cave Architecture

The cave architecture in India is believed to have begun in the third century BC. These caves were used by Buddhist and Jain monks as places of worship and residence. Initially the caves were excavated in the western India. Some examples of this type of cave structure are Chaityas and Viharas of Buddhists.

Rock Cut

The Rock-cut structures present the most spectacular piece of ancient Indian art specimen. Most of the rock-cut structures were related to various religious communities. In the beginning, remarkable Buddhist and Jain monuments were produced in areas such as Bihar in the east and Maharashtra in the west.

Temple Architecture

In ancient India, temple architecture of high standard developed in almost all regions. The distinct architectural style of temple construction in different parts was a result of geographical, climatic, ethnic, racial, historical and linguistic diversities. Ancient Indian temples are classified in three broad types. This classification is based on different architectural styles. employed in the construction of the temples.

Colonial Architecture

Like all other aspects, colonization of Indian also had an impact on architecture style. With colonization, a new chapter in Indian architecture began. The Dutch, Portuguese and the French made their presence felt through their buildings but it was the English who had a lasting impact on architecture.

(Source : Internet)



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Add to Your Vocabulary

Casement Window

A window, which is hinged on the side, allowing it to swing open outward. A quadrant gear forces a lever to open and close the window when the crankshaft, which is attached to a gear that turns the quadrant gear, is turned. Windows will be held in any position by the gearing, which can also be operated by remote control.

Cement Mixtures

Rich-1 part cement, 2 parts sand, 3 parts coarse aggregate. Used for concrete roads and waterproof structures. Standard-1 part cement, 2 parts sand, 4 parts coarse aggregate. Used for reinforced work floors, roofs, columns, arches, tanks, sewers, conduits, etc. Medium-1 part cement, 2 ½ parts sand, 5 parts coarse aggregate. Used for foundations, walls, abutments, piers, etc. Lean-1 part cement, 3 parts sand, 6 parts coarse aggregate. Used for all mass concrete work, large foundations, backing for stone masonry etc. Mixtures are always listed Cement to Sand to Aggregate.

Chemical Injection Grouting

Leak repair technique usually used below grade in cracks and joints in concrete walls and floors that involves injection of sealant (usually urethane) that reacts with water to form a seal.

Dike

An earthen embankment constructed to retain floodwater; when used in conjunction with a bridge, it prevents stream erosion and localized scour and/or so directs the stream current such that debris does not accumulate; also known as known as dyke.

Construction Joint

The contact between the placed concrete and concrete surfaces, against or upon which concrete is to be placed and to which new concrete is to adhere, that has become so rigid that the new concrete cannot be incorporated integrally by vibration with that previously placed. Unformed construction joints are horizontally placed or nearly so.

Dolphin

A group of piles driven close together and placed to protect portions of abridge exposed to possible damage by collision with river or marine traffic.

Dampproofing

A process used on concrete, masonry or stone surfaces to repel water, the main purpose of which is to prevent the coated surface from absorbing rain water while still permitting moisture vapor to escape from the structure. (Moisture vapor readily penetrates coatings of this type.) "Dampproofing" generally applies to surfaces above grade; 'waterproofing" generally applies to surfaces below grade.

Dado Joint

Joint which is made by cutting a groove or dado into one piece of wood to allow another piece of wood to allow another piece of wood to fit into it. This very strong joint is normally used in cabinet making. There is a straight dado joint which has a groove cut from edge to edge of the piece of wood. In the other type, the wood stops short of the edge so that the joint is not visible from the face of the piece.

Dolphin

A group of piles driven close together and placed to protect portions of abridge exposed to possible damage by collision with river or marine traffic.

Double Movable Bridge

A bridge in which the clear span for navigation is produced by joining the arms of two adjacent swing spans or the leaves of two adjacent bascule spans at or near the center of the navigable channel.

Cornice

A horizontal projecting course on the exterior of a building, usually at the base of the parapet. In residential construction, the overhang of a pitched roof at the cave line, usually consisting of a facie board, a soffit for a closed cornice, and appropriate moldings.



Professional Vistas

٠	Recognition by Govt. of India, Ministry of		•	Reco
	Human Resource Development, Department of Higher Education			Roads
	vide Gazette Notification No. F.24/1/2007-TS.III			vide le Dated
	Dated 06.11.2007.			Recog
•	Recognition by Association of Indian Universities (AIU)			Capita
	vide letter No. EV/III (366)/2008/71 Dated 11.04.2008.			vide le 29.10.
•	Recognition by All India Council for Technical Education (AICTE)		•	Reco vide le
	vide letter No. Eqvi./AB/Gen.Corr./2008-09 Dated 16.09.2008.		•	Recog Prade
•	Recognition by Union Public Service Commission (UPSC)			vide le 05.11.
	vide letter No. F.2/1/2007-EIB Dated 30. 06.2009.		•	Recog Diu (U
•	Recognition for GATE by National Coordinating Board-Gate, Deptt. of Education, MHRD, Gol.			vide le 09/797
			•	Reco
•	Recognition by Government of Goa			Depar
	vide letter No.12/11/87-PER/Vol.II Dated 06.03.2008.			vide le 19.01.
•	Recognition by Directorate of Technical Education, Haryana		•	Recog Unive
	vide letter No.351-53/Dev. Dated 13.06.2008.			vide le
•	Recognition by Government of Kerala			Dated
	vide letter No.3946/GI/08/H. Edn Dated 08.07.2008			Recog vide le
•	Recognition by RITES Limited		•	Reco
	vide letter No. RITES/RI/RCED/Misc/2008 Dated 14.07.2008.			PWD, vide le
•	Recognition by Delhi Development Authority (DDA)		•	Dated Recog
	vide letter No.F.7(98)2008/PBI/2399 Dated. 20.08.2008.			Depar Manpo
•	Recognition by Government of Meghalaya			Mantr
	vide letter No. FDN.156/2001/249-A Dated 21.08.2008.		•	vide le Recog
•	Recognition by IRCON INTERNATIONAL LIMITED			Techn Punja
	vide letter No. IRCON/HRM/31/28/728 Dated 01.09.2008.			vide le
		1		

 Recognition by Directorate General Border Roads

vide letter No. 13616/Gen/Rect /DGBR/97/E1A Dated 21.10.2008.

- Recognition by Government of National Capital Territory of Delhi vide letter No.1(1)/2008-DD/SB/1520/5609 Dated 29.10.2008.
- Recognition by Shapoorji Pallonji & Co. Ltd. vide letter No. Nil Dated 30.10.2008.
- Recognition by Government of Andhra Pradesh vide letter No. 10232/EC.2/2008-02 Dated
- 05.11.2008.
- Recognition by Administration of Daman & Diu (UT)

vide letter No. 10.2 (PART-IV) EST-GP/2008-09/797 Dated 11.11.2008.

- Recognition by CPWD- Central Public Works Department, Government of India
 vide letter No.A-12021/1/2006-EC VI/74-75 Dated 19.01.2009.
- Recognition by Visvesvaraya Technological University, Karnataka

vide letter No. VTU/Aca/OS-GC/2009-10/2118 Dated 04.06.2009

- Recognition by Government of Nagaland
- vide letter No. IT/10-1/04 Dated 30.07.2009
- Recognition by Government of Uttarakhand, PWD, Pauri Garhwal

vide letter No.1011/20(15) E.A.-Parv./09-10 Dated 06.09.2009.

• Recognition by Government of Chhattisgarh, Department of Technical Education, Manpower Planning, Science & Technology, Mantralaya, D.K.S Bhavan, Raipur

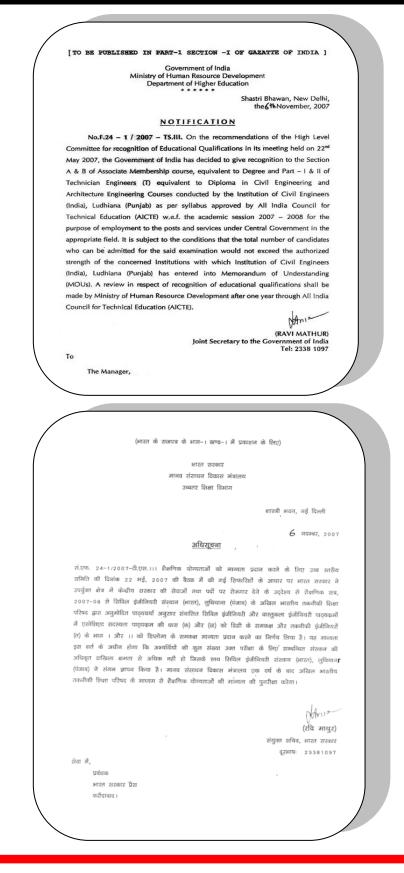
vide letter No.F-14/07/42 Dated 11.05.2010.

 Recognition by Government of Punjab, Technical Education and Industrial Training, Punjab Chandigarh.

vide letter No.1362 Dated 24.06.2010.



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Snippets

Er. S.L. Swamy, Chairman ICE(I) elected for Board of Governors of Engineering Council of India (ECI).

Er.S.L. Swamy, Chairman ICE(I) has been elected as a Member to the Board of Governors of Engineering Council of India (ECI) for the term 2010-12. The Board of Governors is the highest body of the Engineering Council of India (ECI).

MEETING OF THE TRANSIT ORIENTED DEVELOPMENT SUB-GROUP III OF DELHI DEVELOPMENT AUTHORITY (DDA) NEW DELHI

Dr. S. D. Sharma, Director (Academics) ICE(I) attended the first meeting of the Transit Oriented Development (TOD) Sub-Group III pertaining to retrofitting and New Transport Project Guidelines as constituted Delhi bv the Development Authority (DDA) on 14th June, 2010 to discuss various projects on the subject. ICE (I)is an Institutional Member on this group.

We welcome Govt. of Punjab Education Department & Technical Education & Industrial Training, Punjab Chandigarh by joining the family of ICE(I) by according their recognition to ICE(I) examinations. Snippets

INTERNATIONAL AWARD FOR DELHI METRO

The Delhi Metro Rail Corporation (DMRC) nominated by the Institution of Civil Engineers (India) has won the Asian Civil Engineering Coordinating Council's (ACECC) Outstanding Civil Engineering Project Award for the year 2010. The Award is presented to infrastructural projects that have made exemplary contributions to the progress of civil engineering works thereby contributing to the nation where the project is located and have impacted on or spread through other Asian nations or ACECC member economies. The Asian Civil Engineering Coordinating Council (ACECC) has invited Dr. E. Sreedharan, MD of DMRC, to receive the award on 10th August,2010 at the CEACR 5 ASECC 2010 Conference being held at Sydney, Australia.

ICE(I) WINTER-2010 EXAMINATION

The Winter-2010 Examination of ICE(I) will start from 18th December,2010. Detailed Date Sheet will appear in the next issue of THE CIVIL ENGINEER NEWS LETTER.

The Institution of Civil Engineers (India)