

# The Institution of Engineers (India)

## U.P. State Centre

**IE (I) NEWS** "96 Years of Relentless Journey Towards Engineering Advancement for Nation Building"

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### From Chairman's Desk



Dear Brother Engineers,

In accordance with the Institution of Engineers (India) vision which includes up keeping the professional excellence for Engineering fraternity focusing on strengthening of infrastructure, a Lecture meeting on 'Geo-Synthetics over view & application in Infrastructure development Projects (Roads)' was organized on 7th Feb 2016 . The speaker Er Ravikanth Vetcha, Asst. Vice President, Reliance Industries Limited highlighted the usefulness of Geo-synthetic products for environmental protection as well as in the Infrastructure development. The event was attended by more than 70 Engineers from PWD and Members of the IEI and was very successful. In the same context to upkeep the activities for professional excellence, I request all the members to come forward with the idea and topic for organizing workshop, Lecture Meeting and Seminars on the concurrent topics to protect environment and for infrastructure developments for a 'Skilled India'.

I convey my best wishes to all members and their families on forthcoming Mahashivratri, a very colourful Holi and Good Friday.

(A.K. Gupta) FIE

### Forthcoming Events at IEI, U.P. State Centre

Sl.No.	Date	Event
1.	22.03.2016	World Water Day
2.	27.03.2016	Holi Milan
3.	17.05.2016	World Telecom & Information Society Day
4.	05.06.2016	World Environment Day

### For Members Attention

We have started SMS service to inform the programmes to be held at the State Centre one or two days before the scheduled date as a reminder. All are requested to update their mobile number so that they may be benefitted by this service.

### Lecture Meeting on 'Road Marking Paint'

Mr R K Yadav, Manager, Asian Paints delivered Lecture on 'Thermoplastic Road Marking Paints on 9th Jan. 2016 at UP PWD Auditorium organized by The Institution of Engineers (India), UP State Centre & UP PWD. He said hot applied thermoplastic road markings are to be applied as per the specification and guidelines given in MoRTH specifications Clause 803.4, IRC 35 the application and testing parameters to be followed as per BS-EN-1436 specifications.

Since the composition of material can be tested only prior to application of material and in a approved lab consisting of all testing facilities, it is imperative that the material reaching the site to be tested in third party labs on random basis, not only for the purpose of material approval but also after the start on works. It is suggested that the material be sent for testing by picking up a bag randomly from the site (truck containing material and boiler). Such material to be transferred to a normal plain HDPE Woven bag (Rice bag etc.) and sent for testing to get unbiased results.

It is explicit that all contractors would like to do a good and honest job if properly compensated, so it is important for the client to take the costing of material, labour and profit into consideration in the contract and only then award the works of this "Live saving item" instead of just considering the L1 quotation. It has been experienced that since the material specification consists of a Recipe (composition) which cannot be tested or judged at site, agencies with L1 quotations (usually very-very low) does not meet the specifications, knowing that once the approval is done with the GOOD material the works can be carried out with low quality material because the Thermoplastic Road Markings, done with material not meeting the specifications, cannot be judged at site until a period of 6 months, when it starts showing the failure.

## Thermoplastic Application

Like the application of any coating, surface preparation and application procedure followed is vital for the successful performance of thermoplastic road marking. A thermoplastic stripe, properly placed, will melt, wet and fuse with underlying asphalt surface to form a thermal bond via heat-fusion. When applied on concrete roads and oxidized or aged asphalt roads which are suitably primed, a tenacious mechanical bond is achieved. The basic steps that are involved in the application are surface cleaning, primer application (if required), material preparation & application of thermoplastic stripe and drop-on glass beads. A few basic guidelines about the various aspects of thermoplastic application and equipments can be seen below:

- Application equipment
- Application
- Inspection & trouble shooting
- Concerns
- Do's & Don'ts

### Application Equipment

Hot-applied thermoplastic is heated to 180 – 200 Deg Centigrade in a pre-heater with adequate agitation till the material becomes a homogenized liquid. Thereafter the material is transferred into the kettle of a screed, ribbon or spray device from where the material is laid at its specified width and thickness. Glass beads are immediately applied to provide initial retro-reflectivity.

- The key criteria of the pre-heater and kettle are as follows:
- Use of a heat transfer medium consisting of oil or hot air.
- No direct contact of the burner flame with the vessel surface adjoining the material
- Appropriate mechanism for ensuring adequate agitation
- Even heating of material to its application temperature, without scorching
- Maintaining temperatures between 180 - 200 Deg. Centigrade
- Temperature gauge indicating the temperature of the thermoplastic material

Three types of glass bead dispenser are there, namely, gravity system, gear feed systems and pressure-type system. Proper glass bead dispensing implies that the glass bead should be evenly dropped, embedded up to 50 to 60 % and should not have an angular entry into the film. The pressure type system which is mostly found in automatic and semi-automatic machines is best suited as the angle of entry and application pressure is controlled. In the case of gravity feed, embedment is usually not an issue but angle of entry is and the case is reversed in the case of gear feed systems. Various thermoplastic dispensing devices are there, the most common being screed type which is usually semi automatic or manual. In extrusion type devices a screw pushes the material to create a well defined line. Extrusion devices are usually automatic. Spray application of thermoplastic is possible wherein the molten material sprayed using compressed air. Each dispensing device would require a different formulation to achieve the desired properties of the thermoplastic stripe.

### Application

Choosing the location of marking is vital. Ideally, the stripe should be placed directly on the lane, preferably 2 inches from the shoulder and construction joints. Edge lines should not be marked directly over the joint formed between the roadway and the

adjoining shoulder. Skip line markings should not be marked over longitudinal joints. A daily inspection of equipment should be made to ensure that it is operable and within the specification requirements. Breakdowns of equipment during the day may cause thermoplastic materials to be held too long or heated improperly. Intermittent malfunctions of equipment can also cause inconsistent performance of small sections of markings within a limited area. Continuous uniform operation of all equipment, used to make thermoplastic applications, is of extreme importance. Equipment should be kept clean and free of material residue build-up. Prior to the application, the road surface should be cleaned of all dust and dirt. While wire brushing is the most common method of cleaning, an air blast is also recommended to clean the surface. In a few instances, more effort or different methods such as abrasive-blasting or mechanical removal may be needed. While new thermoplastic applications would successfully bond with worn out existing thermoplastic lines poorly adhering marking should be removed. Previous deposits of ordinary paint should also be removed. Oil spills & deposits should be either absorbed or burned. The surface should be devoid of moisture. Presence of subsurface moisture can also affect proper bonding. Early morning dew and fog conditions will also cause dampness. If excess exists, it will usually result in blistering the hot-applied marking. Blisters will form as surface bubbles which may or may burst open. They are easily spotted, and if the condition occurs, marking operations should be stopped until the pavement dries. Clearly, if the surface is unclean or wet, the required thermal / mechanical bonding will not be accomplished. If this does not occur, then the full service life of the marking will not be realized. Air and surface temperatures should be at least 10 Deg C during application. Surface temperature should also not exceed 50 Deg C. The surface temperature should be verified with a surface or non-contact thermometer at the start of each day's work. The surface temperature should be checked periodically throughout the work day. If at any time during work, the surface temperature is not within the recommended road surface temperatures for the given mode of application, all marking operations should be stopped.

On surfaces that are to be primed before the application of the thermoplastic material, the primer material shall be sprayed / brushed on the surface as recommended by the manufacturer of the primer. Prior to application, it must be ensured that the primer is thoroughly dry and void of solvent.

The thermoplastic material must be applied at a temperature range between 180-200 degree centigrade depending upon ambient weather conditions. The indicated material temperature should preferably be maintained at the point of road contact. Applying thermoplastic at proper applications temperature is one of the most critical factors affecting the bonding to the substrata. The thermoplastic material temperature in the kettles, applicators, and at the exit of the dispensing device should be periodically verified with a non-contact infrared thermometer.

The resin binders used in alkyd and hydrocarbon thermoplastic material starts degrading at temperatures of 220 Deg C and above. If thermoplastic materials are held at 220 Deg C and above for more than 4 hours, it can be expected that the material viscosity and temperature relationships will not be constant and material may not be suited for application.

Minimize material remaining in kettle at the end of work day

and blend a minimum of 80% fresh material for the next day. On resurfacing projects, water may be sprayed on newly applied thermoplastic for rapid line hardening. Allow about 40 seconds before water is sprayed. Do not wet surfaces to be striped.

The specified alkyd or hydrocarbon thermoplastic thickness may vary from 2 to 3 mm. The service life of a thermoplastic marking is directly related to its thickness. A thin line will wear out much faster than a thicker line. Further, thickness also play an important role in ensuring that the material holds enough heat necessary for good bonding. It also contributes to the retro-reflective performance of the stripe.

To ensure that the proper thickness is being applied, both the wet and the dry line thickness of the line may be routinely checked. Wet thickness is inspected immediately after the line is applied by inserting a thin, graduated rule or similar instrument into the molten thermoplastic to the depth of the pavement substrata. The line thickness is simply determined by visually noting the depth of penetration. The most accurate determination of thickness can be accomplished by laying a metal panel or black duct tape in the dispensing device path. After the application is made on the panel, it is removed and the total material thickness and panel can be measured with a micrometer. Subtract the panel thickness measured to calculate the true thickness of the thermoplastic line applied.

The thermoplastic thickness should be uniform and consistent throughout the total length of the job. Overall discrepancies in the application rate and the total thermoplastic thickness will affect the durability and performance of the line.

The glass beads are to be evenly dropped-on to the hot thermoplastic stripe immediately after its application, embedding and anchoring at a depth of 50 - 60%. The purpose of glass spheres is to provide initial night time retro-reflectivity of the pavement marking which, without them, would be barely visible to the motorist. The bead dispenser should be inspected frequently to ensure proper operations and to ensure uniform rates of bead application over the entire marking surface.

Drop-on glass beads must be immediately deposited after applying the thermoplastic line. If the glass beads are not adhering to the thermoplastic line, all operations should immediately be suspended until the problem is corrected.

### Inspection & Trouble Shooting

The applied thermoplastic markings should be inspected continually for overall workmanship. Markings should be of the specified width, with clean cut edges. The drop on glass sphere application should appear uniform on the entire marking surface. Over saturation with glass spheres can cause excessive line embrittlement, reduced retro reflectivity and premature abrasion. The hardened thermoplastic should resist deformation, dirt pick up, etc. by traffic within 10 to 15 minutes of application.

The marking should be firmly bonded to the pavement surface. If the thermoplastic marking can be easily removed for the pavement with the use of a putty knife, and little or no bituminous substrate is on the back of the marking, then it can be assumed there is not a sufficient bond to the substrata. There must be fusion with the bituminous pavement to ensure maximum bond strength. Concrete bond strength can be checked by attempting to force separation with a stiff putty knife.

## Lecture meeting on 'Geo-synthetics -over view and applications in Infrastructure Development Projects-Roads

A lecture meeting was organized jointly by IEI, UP State Centre and UPPWD at the Institution of Engineers (India), UP State Centre auditorium on 7th February, 2016. Er Ravikanth Vetcha, Vice President, Reliance Industries Limited has a very large experience on the subject Geo-synthetics and according to him Environmental protection as well as the base of countries progress-Specially Road is closely associated with the use of Geo-synthetic materials.



Er. Ravikanth Vetcha giving power presentation

He informed that Geo-synthetics is a planer product manufactured from polymeric materials used in contact with soil, rock, earth or any other geotechnical engineering related material as an integral part of a man made project, structure or a system to perform a single or multiple functions. These functions are

- Separation
- Filtration
- Reinforcement
- Drainage
- Containment

He told that Raw material polypropylene, polyethylene, PVC, Polyester are used to manufacture various products of Geo-synthetics i.e. geo-textiles, geo-grids, geo-cells, PVDs, geo-membranes, geo-composites. He also described the various products of geo-synthetics viz. a viz. functions in details. Geo-Synthetics are used for Environmental protections in Landfill engineering, canalling, Dewatering Application, Coastal protection, River training and flood control, Rock fall protection etc. It is also used in Roads, Railways and ground improvement in the field of Infrastructure.

Through his detailed lecture, carrying all aspects, he emphasized that use of geo-synthetics has advantages over other materials as it has minimal impact on environment, quick in installation and reduced cost by using local materials and equipments as well as longevity of the Road life also reduces the annual cost.

More than 70 engineers of PWD and the members of IEI attended the lecture. Earlier Er A K Gupta, Chairman, IEI, UP State Centre welcomed the guests, members and the speakers. Shri Praveen Malhotra, Honorary Secretary of the UP State Centre delivered the Vote of thanks.

**TWENTY-FOURTH IEI CONVOCATION AND  
TECHNICIANS'/STUDENTS' CONVENTION**

Pune, October 22-23, 2016

**Theme: APPROPRIATE TECHNOLOGY FOR  
SOCIO-ECONOMIC DEVELOPMENT****Sub Themes :**

- Building and Construction — Low Cost Housing, Construction Material, Techniques, etc.
- Energy Services — Distributed Generation using Renewable Sources like Solar, Wind, Biomass, Mini Hydel — based Energy Sources, etc.
- Water Supply — Low Cost Water Treatment Techniques
- Sanitation Services
- Irrigation
- Food Production, Preparation and Preservation
- Transportation — Zero Emission Vehicles
- Information and Communication
- Environmental Conservation and Protection
- Human Comfort

With this in focus, papers are invited from Technician/Senior Technician members, students of polytechnics and engineering colleges for presentation in the All India Technicians'/Students' Convention to be held on 22 Oct 2016 at Pune. The papers shall be on innovative ideas, design, prototype and technology development, case studies, survey details augmenting innovations, etc. pertaining to the theme so as to reach at Pune Local Centre latest by 25 Sep 2016.

Organized by : **The Institution of Engineers (India)**  
Hosted by : **Pune Local Centre**

For further information, please contact :

The Organising Secretary (Convocation 2016), The Institution of Engineers (India),  
Pune Local Centre, 1332 Shivaji Nagar, J M Road, Pune 411 005

Phone : (020) 2553 3376, Fax: (020) 2553 0150

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**Notification for  
R&D Grant-in-Aid (2016-17)**

The Institution of Engineers (India) invites applications, as per the format available on our link <http://www.ieindia.org>, for grant-in-aid in support of industry-oriented R&D projects for the session 2016-2017 for supporting students (Diploma/B Tech/M Tech/ Research Scholars) working under the guidance of faculty members who should be Corporate Member of IEI. After filling up the application as per the given format send the application through email to [research@ieindia.org](mailto:research@ieindia.org) and one printed copy of the same to the following address:

**Director (Technical)****The Institution of Engineers (India), 8 Gokhale Road,  
Kolkata 700 020**

Applications received in format other than given in the above link will not be accepted. Application should be forwarded through the Guide, Head of the Department and Head of the Institution. Please note that preference will be given to projects received from Institutions who are members of The Institution of Engineers (India), projects dealing with industry-oriented/applied research with matching grant from industry. In case of project proposal from UG and Diploma students it is desirable that he/she be a member of the Students' Chapter of the IEI, if available at his/her institution. In case of proposals from PG and PhD scholars, the applicants should be members of IEI. The grant is not intended for the faculty members who have access to other avenues for research funding. Proposals received will be scrutinized and the recipients of R&D Grant will be informed accordingly.

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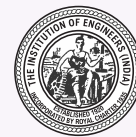
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**IEI AWARDS**

The Steel Authority of India Ltd (SAIL) had instituted two Awards, namely, SAIL AWARD and DR M VISVESVARAYA AWARD to be given away every year during the Indian Engineering Congress to author/s of the articles adjudged best on selected topics. The topics for the year 2016 are given hereunder.

**SAIL AWARD****'Improving Safety, Health & Environment in the Steel Industry'****DR M VISVESVARAYA AWARD****'Role and Contribution of Steel Industry to  
'Make in India' Programme**

Intending contributors are requested to submit their articles (visit [www.ieindia.org/jourtechdwnlds.aspx](http://www.ieindia.org/jourtechdwnlds.aspx) for guidelines) in quadruplicate to Director (Technical), The Institution of Engineers (India), 8 Gokhale Road, Kolkata 700 020 by **July 15, 2016**.



**The Institution of Engineers (India)**  
**8, Gokhale Road, Kolkata 700020**

**Approval of AICTE for AMIE Passouts  
with M.E./M.Tech for Teaching Assignments**

It is hereby informed that All India Council for Technical Education (AICTE), through Extraordinary Gazette notification, part III, Section 4 published by Government of India on 06 January 2016, clarified under item (E) Miscellaneous Issues, S.No. 67, page 31 (in Hindi, Page 12, S. No.67) that passing Sections A & B examinations (AMIE), along with M.E./M.Tech degree acquired through contact mode (i.e. regular/part time), is accepted for the appointment as a faculty in Technical Education.

Ref : [http://www.aicte-india.org/downloads/clarification\\_2016.pdf#toolbar=0](http://www.aicte-india.org/downloads/clarification_2016.pdf#toolbar=0)

**Issued by**  
**Secretary & Director General - I/C**  
**for and on behalf of The Institution of Engineers (India)**

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