Presentation were arranged on subject Structural Audit Procedures and Requirements on 25/02/2019 at ‘Abhiyanta Bhavan’ Firodiya hall Pune Local Centre at 6.30 pm. Er. Atul Gadgil Executive Director of Pune Maha Metro had delivered Educative Presentation along with (Guide-Lines) from Dr. Arun Bapat EX. HOD Earthquake and Seismic Engineering CWPRS Khadakwasla Pune. at the beginning Convener Er. Dhananjay K Latkar gave Introduction of this subject with needs and Implementation. He added the subject Structural Audit had come largely in discussion when one river bridge across river Savitri on NH17 at Mahad Konkan region of Maharashtra state was washed in the beginning of monsoon in mid night causing big loss to human life. Before that Movement Redevelopment of existing building in Metro cities started big way. Actually reason to boost this activity was pulling down unsafe building due to their life, Monsoon and Effect of rail line passing near to these buildings, Inspection of such building was done visually and recording small collapses of part of a building. Now there are advance Methodology to diagnosis Health of building by Instrumentation.

Now in most of Metro cities Metro Rail Projects as a need of Modern means rapid Mas Transport are progressing very fast, These Metro line are many places elevated as well as underground, under rivers, under buildings and other Infrastructures etc. Hence it is Prime important to have Structural Audits of such properties having influence of Metro alignment on building before starting actual deep cuts, tunnel boring, cut and cover, NATM Techniques.

Looking towards boosting movement to redevelopment of premises it is mandatory to have Structural Audits OF original buildings likely to be unsafe are given more consideration for redevelopment. Er. Dhananajay Latkar appealed to Structural Engineers and Chartered Engineers kindly avoid to give unsafe certificate at developers demand but study the premises, Owners have Non-Engineering practice during renovation of their property. Without seeking consulting Engineer newly occupied premises broken for drainages, conducting of slit AC. beams with reinforcement cutting are bored. This is not only making damage to design but also cause rusting of reinforcement. Normally any RCC building has life of at least 60 70 years.

Er. Atul Gadgil Executive Director of Pune Maha Metro has given very good presentation starting from layout of Pune Maha Metro with influence zone while doing boring of underground pass. He also gave total outlay of Pune Maha Metro project with phases of constructions with the help PPT.
**Zone of Influence (ZOI)**

- ZOI is the volume of geomaterial influenced by the tunneling operations.
- Any buildings or other structures located within this zone shall be subject to:
  - Pre-Construction Condition Survey (PCCS)
  - Assessment of Risk of damage (Construction Impact Assessment)

We will be carrying out pre and post construction condition survey of buildings coming within the zone of influence.

He also gave Presentation Pre Construction Structural Audit, data records called building construction survey shortly called as BCS, A list of structures shall be prepared to identify where the preconstruction survey shall be conducted based on the final alignment drawings and criteria for zone of influence.

Each structure shall be identified by a unique identification number. A Schedule/program for pre-construction structure condition survey works shall be defined based on construction schedule and progress. Permit obtained from owner before building survey start A visual survey shall be performed, taking photographs of the deficiencies and record the pre-construction condition of all structures. An deficiencies, such as existing settlement cracks, shall be recorded in such manner as not to permanently deface the structure. The condition of the building shall be classified. A complete survey form/report shall be completed for the Precondition survey, for each floor of the structure.
The survey form/report shall clearly identify any damage to the structure in the form of cracks or damage to finish etc.

### Building category

<table>
<thead>
<tr>
<th>Damage category</th>
<th>Degree of damage</th>
<th>Description of typical damage and likely form of repair for typical masonry buildings</th>
<th>Crack width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Negligible</td>
<td>Hairline cracks. Fine cracks easily treated during normal redecorations. Perhaps isolated slight fracture in building. Cracks in exterior brickwork visible upon close inspection.</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>1</td>
<td>Very Slight</td>
<td>Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible; some re-pointing may be required for weather tightness. Doors and windows may stick slightly.</td>
<td>0.1 to 1</td>
</tr>
<tr>
<td>2</td>
<td>Slight</td>
<td>Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Tuck-pointing and possibly replacement of a small amount of exterior brickwork may be required. Doors and windows may stick slightly. Utility services may be interrupted. Water tightens may be impaired.</td>
<td>1 to 2</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Extensive repair involving removal and replacement of sections of walls, especially over doors and windows required. Windows and door frames distorted. Floor slopes noticeably. Walls lean or bulge noticeably. Some loss of bearing in beams utility services disrupted.</td>
<td>5 to 25 or a number of cracks greater than 25</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
<td>Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require choring. Windows broken by distortion. Danger of instability.</td>
<td>15 to 25 but also depends on number of cracks</td>
</tr>
<tr>
<td>5</td>
<td>Very Severe</td>
<td>Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require choring. Windows broken by distortion. Danger of instability.</td>
<td>Usually greater than 25 but depends on number of cracks</td>
</tr>
</tbody>
</table>

He showed charts to be maintained by owner building. He also showed records of sample observation done by Pune Mah Metro with giving Reference change and 3D coordinates.

He emphasised on records of size of cracks and there interpretation if developing more.

He emphasised on instrumentation used for monitoring survey and fitment position of it.

**Instruments for Building Settlement, Ground Settlement, Bio-Reflex target, Crack Meter, Extenso Meter**

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**INSTRUMENTATION AND MONITORING**

Tilt meters, crack meters, settlement markers will be installed along the tunnel alignment and will be monitored on regular basis according to the Instrumentation and Monitoring scheme along the tunnel alignment. The basic instruments installed are as follows:

- **Soil Settlement Array**: These arrays are spread along the tunnel alignment. The frequency of the array is such that a 3 point array exists at a distance of every 10 meters while a 7 point array exists every 50 meters along the alignment.

- **Building Settlement Points**: These points are installed on buildings within the tunnel influence zone in accordance to the approved Instrumentation and Monitoring Plan.

- **Crack Meters**: These are installed across the crack to measure any changes in the crack width for buildings.

- **Tilt Meters**: The basic purpose for use of Tilt Meters is to check the verticality of building and measure any tilt that may have been caused due to Tunneling operations.

- **Extenso-meter**: The basic purpose for Vertical Settlement just above the Tunnel Alignment.
INSTRUMENTATION AND INSTALLATION

Extensometer Installation
He explained soil settlement array starting from launching of shaft till retrieval of shaft with Trigger level during construction underground activities.

There were big response from audience in quarry and questions and Er. Atul Gadgil and Dr. Arun Bapat gave reply to their sent percent satisfaction.

In concluding section Dr. Arun Bapat expressed total satisfaction including design quarry of tall supporting pillars of elevated metro track.

Welcome and vote of thanks were given by Hon. Er. Araddhana Deshmukh, Hon Secretary PLC.
Introducion of Guest Speaker Dr. Arun Bapat By Er. Dhananjay Latkar.
Felicitation of Guest Speaker Er. Atul Gadgil Executive Director Pune Maha Metro By Prof. A. A. Deshmukh, Hon. Secretary
ANTITERMITE TREATMENT TO BUILDINGS

At the beginning, convener Er. Dhananjay K Latkar introduced Dr. Sagar Savalekar and highlighted the importance of ATT in building construction. Er. Latkar further mention that ATT is the most important activity in building construction but still it is neglected and required more awareness about the suitable ATT practices with recommended procedure for building construction. At the same time syllabus shall be revised and shall teach same at engineering and architectural colleges.

The most important role is ATT is depend upon the soil contact with the foundation of the buildings. Termites enters into the building from sub soil at foundation level. With the heavy strength of destruction, termites are able to reach and may spoil all kinds of cellulosic material like wood, paper, cloth, rubber, plywood etc and during their destruction they may damage the building by creating their own way of travelling from soil to any floor level. In short we can say that termite attack is like a silent journey of cancer to the buildings where heavy destruction and damage may cost to the structure. Cancers can be avoided with some precautions whereas without proper anti termite treatment termite cancer cannot be avoided. ATT applications at proper stages at proper time with proper chemical is necessary.

Main object of this presentation was to make aware about the up gradation of termite treatments for new structures/foundations which are not mentioned in the old guidelines given in all the publications of Bureau Indian Standard as well as National Building Code. With the help of practical site execution for various new projects for basement and high rise structures based on the most recent research done by Dr. Savalekar in his subject and trying to upgrade the same to adapt the same with the amendments in NBC and BIS.

Dr. Sarang Salvekar has done his Ph D in rules for anti-termite treatment for advance construction practices with reference to label and labelling of ‘termiticides’

He had given very good presentation with actual photo slides made by him on introduction of termite, life cycle, types of termites including dry wood termites, damp termites. he has identified more than 2500 species with location of origin/entry and attack to the foundation, RCC, masonry work, flooring, basements, piles, landscapes etc. He also introduced new molecules for anti-termites treatments with the dosages and consumption per stage per smt. as well as he further highlighted the commercial aspect also i.e. cost of chemical i.e. rate analysis, warrantee / guarantee, safety while doing pre and post construction anti termite treatment.

Finally he concluded with the actual cost of this treatment which is very low in comparison to the cost of total building construction /cost of project with multi floors i.e. not even 0.1% as this treatment is given to the plinth area only which protects the entire vertical building with basement.
Introduction of Guest Speaker By Er. Dhananjay Latkar.

Felicitation of Guest Speaker Dr Sarang Savalekar By Prof. A. A. Deshmukh, Hon. Secretary
Address by Dr Sarang Savalekar

Celebration of World Women’s Day

Pune local Centre of The Institution of Engineers (India) celebrated World Women Day on 6th March 2019. Mrs Pratibha Saraf, BSNL, Pune graced the occasion as Chief Guest. Mrs Sumedha Sahastrabuddhe, Director, e-Maestro was Guest of Honour.

At the outset, Prof K K Ghosh, Chairman welcomed the Guests and audience and briefed them about the activities of Pune Local Centre. Ms A A Deshmukh, Hon.Secretary gave introduction of guest and Prof Ghosh felicitated them. Er Sumedha sahastrabuddhe while addressing the gathering highlighted the contribution of women in various sectors. Er Pratibha Saraf in her address cited number of examples of successful Women in India and advised audience (especially Women) to use opportunities to succeed in life. She also talked about challenges faced by women. Er Jyotsana Chaubal Deshpande, Past Chairman, PLC and Er Chitra Patil also shared their views. Programme was attended by Committee members and number of students from various Engg Colleges. Prof (Ms) A A Deshmukh, Hon Secretary proposed the vote of thanks.

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Celebration of World Water Day

The Institution of Engineers (India), Pune Local Centre celebrated World Water Day in association with Central Water & Power Research Station, Pune, National Water Academy, Pune, Ground Water Surveys & Development Agency, Pune, Maharashtra Jeevan Pradhikaran, Pune Region, Indian Plumbing Association, Pune Chapter, Indian Water Works Association, Pune Centre, and Marathi Vidyan Parishad, Pune on Tuesday, 26th March 2019.

Celebration started with Kalash Pujan by all dignitaries. Er. Saraf welcome the guest on behalf of IE (I) Mr. Rahul S Jagtap Joint Director CWPRS gave welcome address on behalf of CWPRS; Mr. Manish Rathore Dy. Director NWA gave welcome address on behalf of NWA. Er. Saraf Convener of the Program explained theme of year. He said we went ahead that is why someone is left behind. He explained how man is drifted from natures with examples. Mr. Anil Kulkarni, Hon Secretary IWWA introduced the speakers. Er. Sudarshan Tandale, Er. Apte & Er. Deshpande felicitated the speakers of the Day. Dr. Pakhmode spoke on GSDA – Ground water – No one left behind. He presented the review of quality and quantity assessment of Ground Water in Maharashtra. He said that data is available to plan the growth. Since there is imbalance between the recharge & draw major part of Maharashtra is facing scarcity of water. Mr. Subhash Patil spoke on Safe & Adequate Water for all. He began with formation of MJP & then explain the major role played by MJP to ensure Safe & adequate water for all. He explained various program like Amrut etc implemented by MJP. Er Saraf took the interview of Ms. Yukta Mookhey, Miss World 1999. She said in her interview that Women of India are conservative and they have to come forward to take lead in water sector. The beginning shall be made from the individual and at home. She appeals all to join her movement in the field of Water and Environment. Mrs. Pradnya Thakur presented a case study of saving water by maid servant. Mr. Chakore of IPA presented I Save Water – Initiatives by IPA. He explained that a device called aerator if fitted brings down the water consumption by 40%. Miss Roma Shukla, 12 yrs old girl presented her expectation from the audience so that she will not left behind when she will be of 20 years old. She appeals audience to preserve & protect water for her generation. Mr. Amit Saste presented case study of Water Governance at Amnora. He said Amnora has implemented all the ideas to ensure water for all. Students of Dr. D.Y. Patil Institute of Technology, Pimpri, Pune IE (I) Student Chapter presented a skit on the theme Save Water for Better future. All artists together created the awareness amongst all. Pledge on water was taken by all the dignitaries and audience present. At the conclusion Er Saraf thanked all and said we will meet again and again throughout the year to implement the theme leaving no one behind. Eminent persons like Dr. Suresh Naik, Shri D. T. Deole, Shri Jayant Gurao, Dr. Neelima Rajurkar, Shri Ranade and others join the celebration.