

BUNIYAAD



*A TECHNICAL MAGAZINE BY
DEPARTMENT OF CIVIL ENGINEERING
AMBALIKA INSTITUTE OF MANAGEMENT & TECHNOLOGY*

JAN-2023



Ambalika Institute of Management and Technology (AIMT) was established in 2008 as a private engineering and management college in (Mohanlalganj) Lucknow, Uttar Pradesh India and is affiliated to AKTU and BTE and Approved by AICTE. The Lucknow campus is spread over 200 acres and is located near NH-56B, surrounded by lush green field and enhanced by a beautiful lake. The institute is 24 kilometers from Lucknow Railway Station and 20 kilometers from Amausi Airport, Lucknow. It is very well connected to the district headquarters.

Ambalika center of excellence has become the most dominating center delivering high-end technical skills to our engineers to make them highly employable. AIMT, Lucknow is imparting training and joint certification programs of innovative technologies in collaboration with the Industry giants such as Microsoft, KUKA Robotics, Siemens, Ace Micromatics, MTab, and Master CAM etc.



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DEPARTMENTAL VISION

To create high quality civil engineers with knowledge par excellence who may contribute in nation building with highest moral and ethical values as true citizens of a civilized society.

DEPARTMENTAL MISSION

To adapt teaching and learning process that gives student power to think and to analyze

To impart practical knowledge by means of lab exposure and industrial interaction

To conduct co-curricular activities for updation of technological advancement

To impart moral and ethical values by means of various programs



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Head of the Department

ADITYA .R. MISHRA

M.Tech Civil

(Structural Engineering)

B.E

(Civil Engineering)

I am very pleased that we have successfully published the “JAN-2023” edition of our departmental magazine “BUNIYAAD”. The technical magazine is a combined effort the students, faculty members and the magazine team. It also gives a firsthand experience of what is going on in the industry at this time. The Magazine article gives an insight of various aspects. This Magazine has served as a platform to students and member of the faculties to present their unique ideas. The Magazine tries to bridge the gap between theoretical knowledge and practical application of Civil Engineering.

I would like to congratulate the editorial team and the members of faculty for working together as a team in publishing this Magazine. I hope the Magazine re-energizes the perspective of Civil Engineering and the Magazine is a Success.

Contents



Students Space



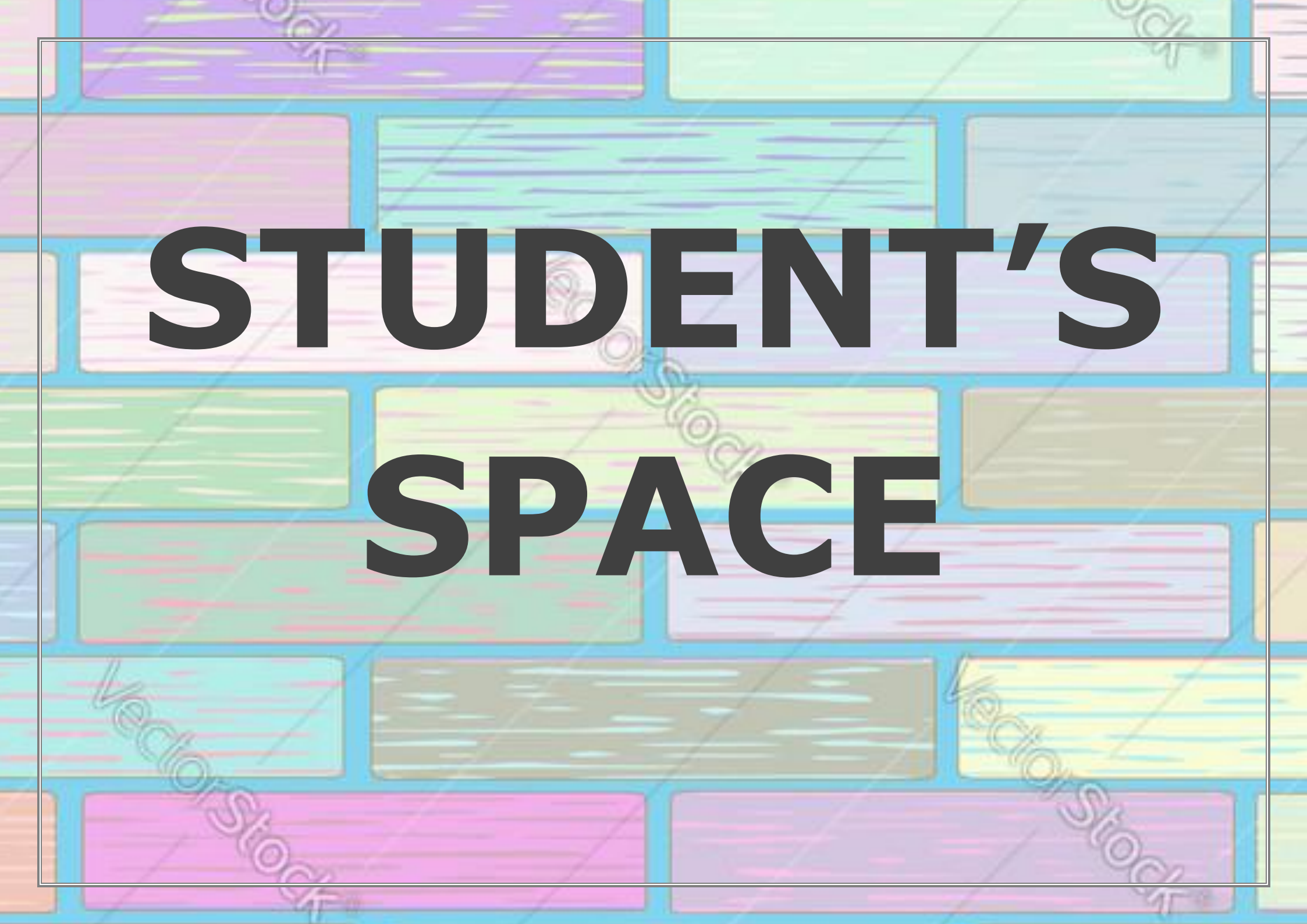
Faculty Wisdom



Credits



Our Patrons



STUDENT'S SPACE

SELF HEALING CONCRETE

What is self-healing concrete?

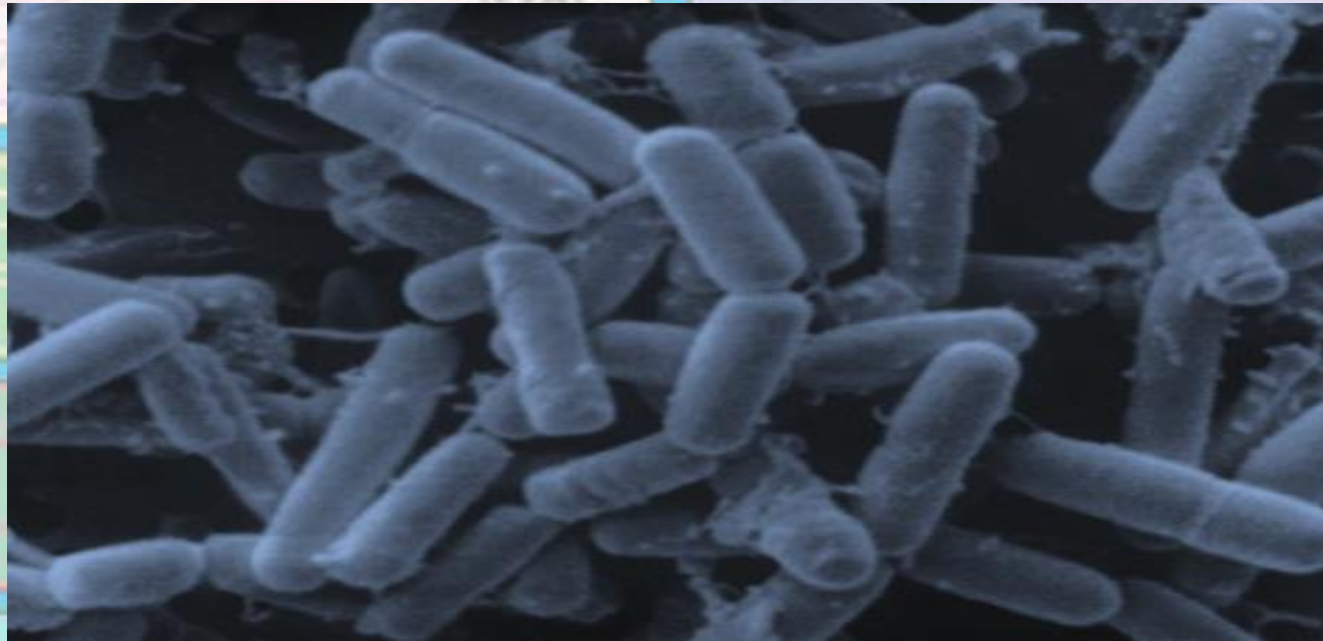
It is a bacterial concrete which fills up cracks by producing calcium carbonate crystals with the help of bacterial reaction in the concrete. Bacteria which are embedded in the concrete while mixing precipitates calcite when comes in a contact with water. The process of self-healing cracks by the help of bacterial reaction in the concrete after hardening is known as Self-Healing Concrete.

Mechanism of self-healing concrete

Self-healing concrete is a result of biological reaction of limestone and calcium based nutrients with the help of bacteria. While preparation of concrete, bacteria are added in wet concrete when mixing is done. When water seeps through cracks in concrete, the pores of the bacteria germinate and start feeding on the calcium consuming oxygen. This soluble calcium lactate is converted to insoluble limestone, which starts to harden thus filling the crack automatically without external aide.

Why bacillus bacteria?

Bacillus bacteria have a positive effect on compressive strength of concrete. Water and cement mixture has high pH value around 13 in which most of micro-organisms die but these bacillus bacteria are alkaline resistant. They withstand the harsh environmental conditions. They are harmless to human life.



Bacillus Bacteria

Prashant Shukla
B.Tech CE-4th Year

WASTE PLASTIC ROADS

Plastics are user friendly but not eco-friendly as they are non biodegradable. Generally it is disposed by way of land filling or incineration of materials which is extremely risky. This waste plastic can be partially mixed with material use for road construction. In conventional road making process bitumen is used as binder. Such bitumen can be modified with waste plastic pieces. This waste plastic modified bitumen mix shows better binding property, stability, density and more resistant to water.

Worldwide use of waste material in road construction is being increasingly encouraged so as to reduce environmental impact. The use of this innovative technology will strengthen the road construction and increase the road life as well as will help to utilization of waste plastic material. Plastic roads would be a blessing for hot and extremely humid climate, where temperatures normally cross 50°C and abundant rains create damage, leaving most of the roads with big potholes.

The main aim of this study is to focus on using the available waste/recycled plastic materials and waste rubber tires present in abundant that can be used economically and conveniently.

Using this technique for road construction proves eco-friendly, economical and use of plastic will also give strength in the sub-base course of the pavement.

A MODEL OF WASTE PLASTIC ROAD



Laiba Aziz Khan
B.Tech CE-4th Year



**FACULTY
WISDOM**

Reference frame and Reference System in Geodesy

Prashant Mishra

M.TECH (Remote Sensing)

B.Tech (CIVIL ENGINEERING)

Need of Accurate Reference Frames:

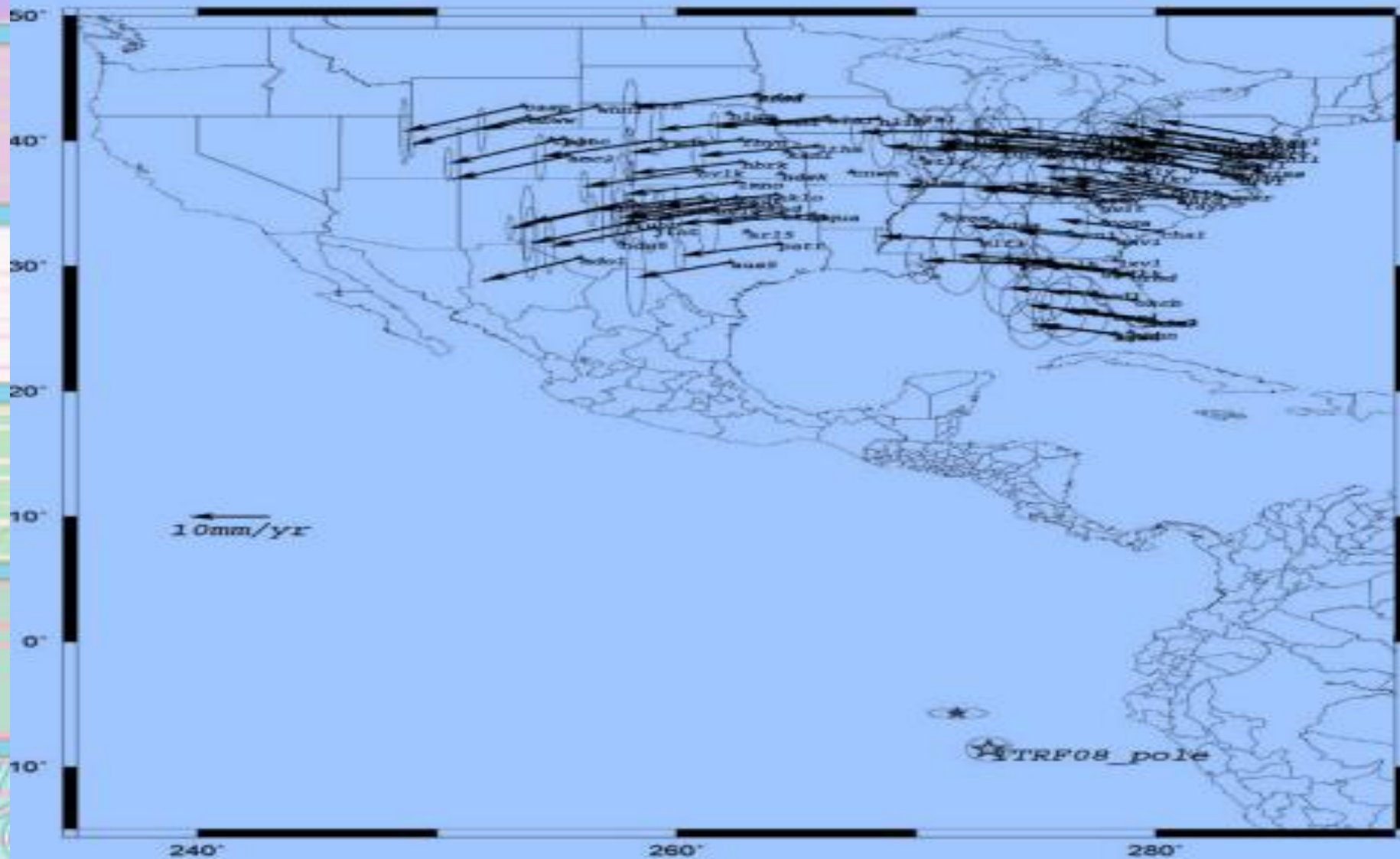
Spatial data related applications such as geodetic and surveying measurements, studies of the global change, and utilization of Earth exploring and navigation satellites. With ever increasing accuracy in measurements and accuracy demands of users, GNSS measurements can be more accurate than the reference frame in which the coordinates are estimated.

Need:

Requirement of a reference frame with accuracy better than GNSS measurements

Static and kinematic reference frames

Majority of local reference frames are static and based on passive benchmarks. Accuracy of such reference frames will be degraded with time relative to a global reference frame. Semi-kinematic reference frame: Instead of regular renewals of a static reference frame, one may prolong its lifetime substantially with adoption of the crustal motion information. Transformation from the epoch and frame of observations to the static reference



INTRA-PLATE TECTONIC MOTION OF NORTH AMERICA

enables accurate link between the global and the national frame. Kinematic reference frame: If such a reference frame is taken in national use, also all geospatial data in registers should have at least three-dimensional coordinates and a time tag but preferably also the velocities.

Eulerian and non-Eulerian motion

Tectonic plate motion is radial about a point called Euler pole knowing the angular velocity of the radial motion we can predict the coordinates at any point of time. Non Eulerian motions are also present which can be separately modeled

Plate independent and Plate fixed frame Plate Independent:

ITRF (Plate fixed): NAD83 There is problem with both these types of reference frames. Plate fixed reference frames ignores the true nature of the Earth by oversimplifying geospatial data collected at different points in time and limiting the ability to combine datasets that cover very large geographic areas. Plate independent reference frame (ITRF) is suited for scientific applications.

Need of a National Reference frame

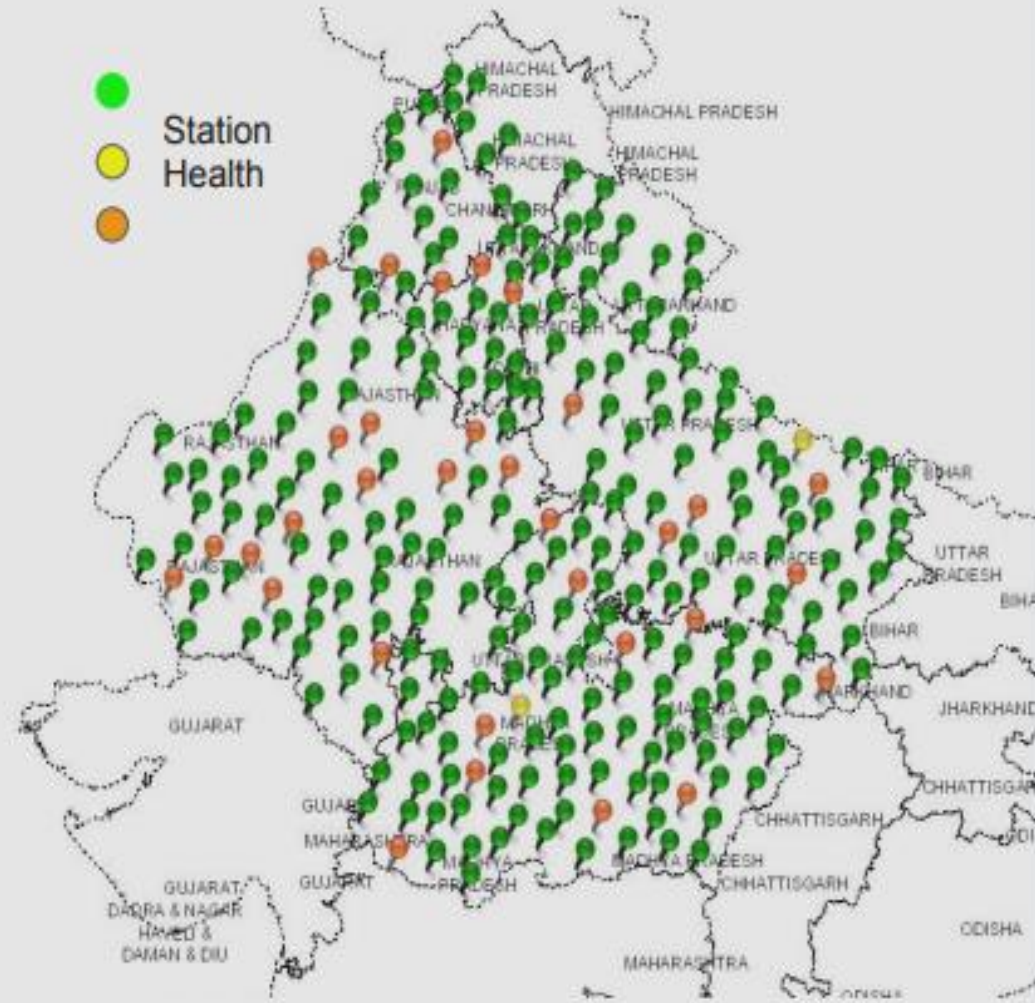
The cost of ITRF is that besides the coordinates, epoch of coordinates and their time evolution must be known and taken into account as well. Therefore it has, so far, not been considered suitable for practical purposes, e.g. in surveying or cadastre systems but used mainly for scientific applications.

Requirements and challenges of national spatial reference framework

Well established and distributed CORS network Modelling of intra-plate and inter-plate motion of tectonic plates Earthquake, compression, GIA signal, coastal sloughing or other geophysical signal would need to be completely and accurately modeled. Establishing a link with the ITRF

CORS Network

- Station
- Health
- Health



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OUR PATRONS

OUR PATRONS



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