BUNIYAAD

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

JULY-2024

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

SURYAKANT SHUKLA

M.Tech (Civil Engineering)

B.Tech (Civil Engineering)

I am very pleased that we have successfully published the "January-2024" edition of our departmental magazine "BUNIYAAD". The technical magazine is a combined effort the students, faculty members and the magazine team. It gives a overview of the major projects taken up in the department. The Magazine article gives an insight of various aspects of Civil Engineering. This Magazine has served as a platform to students and member of the faculties to present their unique ideas. The Magazine is a sincere effort 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

STUDENT'S SPACE

EARTHQUAKE RESISTANT DESIGN

Earthquake-resistant construction, the fabrication of a building or structure that is able to withstand the sudden ground shaking that is characteristic of earthquakes, thereby minimizing structural damage and human deaths and injuries. Suitable construction methods are required to ensure that proper design objectives for earthquake-resistance are met. Construction methods can vary dramatically throughout the world, so one must be aware of local construction methods and resource availability before concluding whether a particular earthquake-resistant design will be practical and realistic for the region.

- Can we predict natural disasters?
- Can we predict natural disasters?

Protecting against natural disasters requires a multipronged approach. There is a fundamental distinction between the design of a building and the construction methods used to fabricate that building. Advanced designs intended to withstand earthquakes are effective only if proper construction methods are used in the site selection, foundation, structural members, and connection joints. Earthquake-resistant designs typically incorporate ductility (the ability of a building to bend, sway, and deform without collapsing) within the structure and its structural members. A ductile building is able to bend and flex when

exposed to the horizontal or vertical shear forces of an earthquake. Concrete buildings, which are normally brittle (relatively easy to break), can be made ductile by adding steel reinforcement. In buildings constructed with steel-reinforced concrete, both the steel and the concrete must be precisely manufactured to achieve the desired ductile behavior.

Building failures during earthquakes often are due to poor construction methods or inadequate materials. In less-developed countries, concrete often is not properly mixed, consolidated, or cured to achieve its intended compressive strength, so buildings are thus extremely susceptible to failure under seismic loading. This problem is often made worse by a lack of local building codes or an absence of inspection and quality control.

Building failures are also frequently attributed to a shortage of suitable and locally available materials. For instance, when a building is designed with steel-reinforced concrete, it is critical that the amount of steel used is not reduced to lower the building cost. Such practices substantially weaken a building's ability to withstand the dynamic forces of an earthquake. In RC buildings, the vertical and horizontal members (i.e., the columns and beams) are built Integrally with each other. Thus, under the action of loads, they act together as a frame transferring forces from one to another. This Tip is meant for beams that are part of a building frame and carry earthquake induced forces.

Designing a beam involves the selection of its material properties and shape and size; these are usually selected as a part of an overall design strategy of the whole building. And, the amount and distribution of steel to be provided in the beam must be determined by performing design calculations as per is:456-2000 and IS13920-1993.

RAVI PRATAP SINGH
B.Tech CE-4th Year

TREATMENT OF WASTE WATER

Wastewater treatment is a process which removes and eliminates contaminants from wastewater. It thus converts it into an effluent that can be returned to the water cycle. Once back in the water cycle, the effluent creates an acceptable impact on the environment. It is also possible to reuse it. This process is called water reclamation.[1] The treatment process takes place in a wastewater treatment plant. There are several kinds of wastewater which are treated at the appropriate type of wastewater treatment plant. For domestic wastewater the treatment plant is called a Sewage Treatment. Municipal wastewater or sewage are other names for domestic wastewater. For industrial wastewater, treatment takes place in a separate Industrial wastewater treatment, or in a sewage treatment plant. In the latter case it usually follows pre-treatment. Further types of wastewater treatment plants include Agricultural wastewater treatment and leachate treatment plants.

One common process in wastewater treatment is phase separation, such as sedimentation. Biological and chemical processes such as oxidation are another example. Polishing is also an example. The main by-product from wastewater treatment plants is a type of sludge that is usually treated in the same or another wastewater treatment plant.[2]: Ch.14 Biogas can be

another by-product if the process uses anaerobic treatment. Treated wastewater can be reused as reclaimed water.[3] The main purpose of wastewater treatment is for the treated wastewater to be able to be disposed or reused safely. However, before it is treated, the options for disposal or reuse must be considered so the correct treatment process is used on the wastewater. Bangladesh has officially inaugurated the largest single sewage treatment plant (STP) in South Asia, located in the Khilgaon area of the capital Dhaka. The STP has a capacity to treat five million metric tons of sewage per day. It marks a significant step towards addressing the country's wastewater management challenges.

AMIT KUMAR
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:

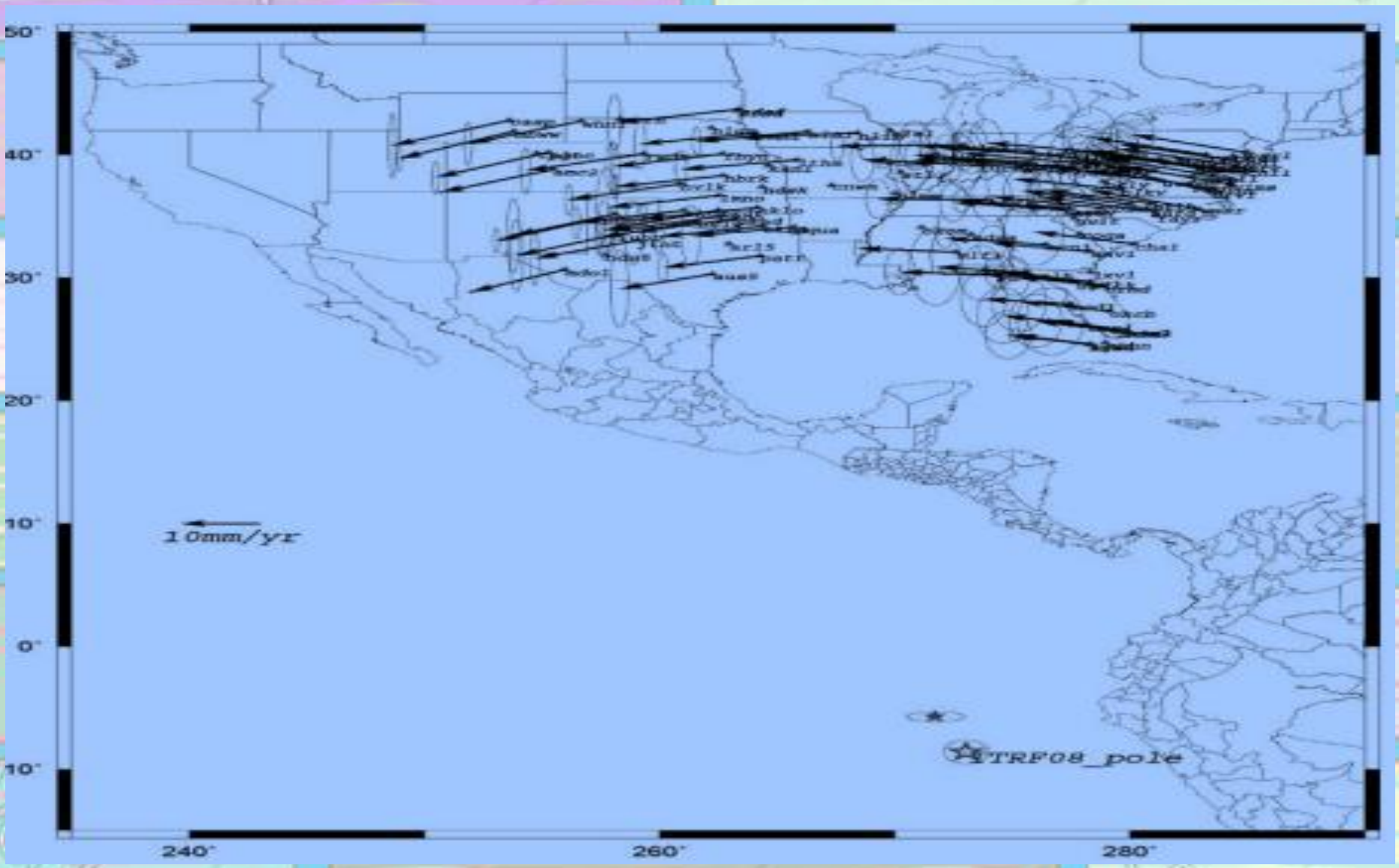
Spatial data related applications such as geodetic and surveying measurements, studies of the global change, and utilization of Earth exploring and navigation satellites. With ever increasing accuracy in measurements and accuracy demands of users, GNSS measurements can be more accurate than the reference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

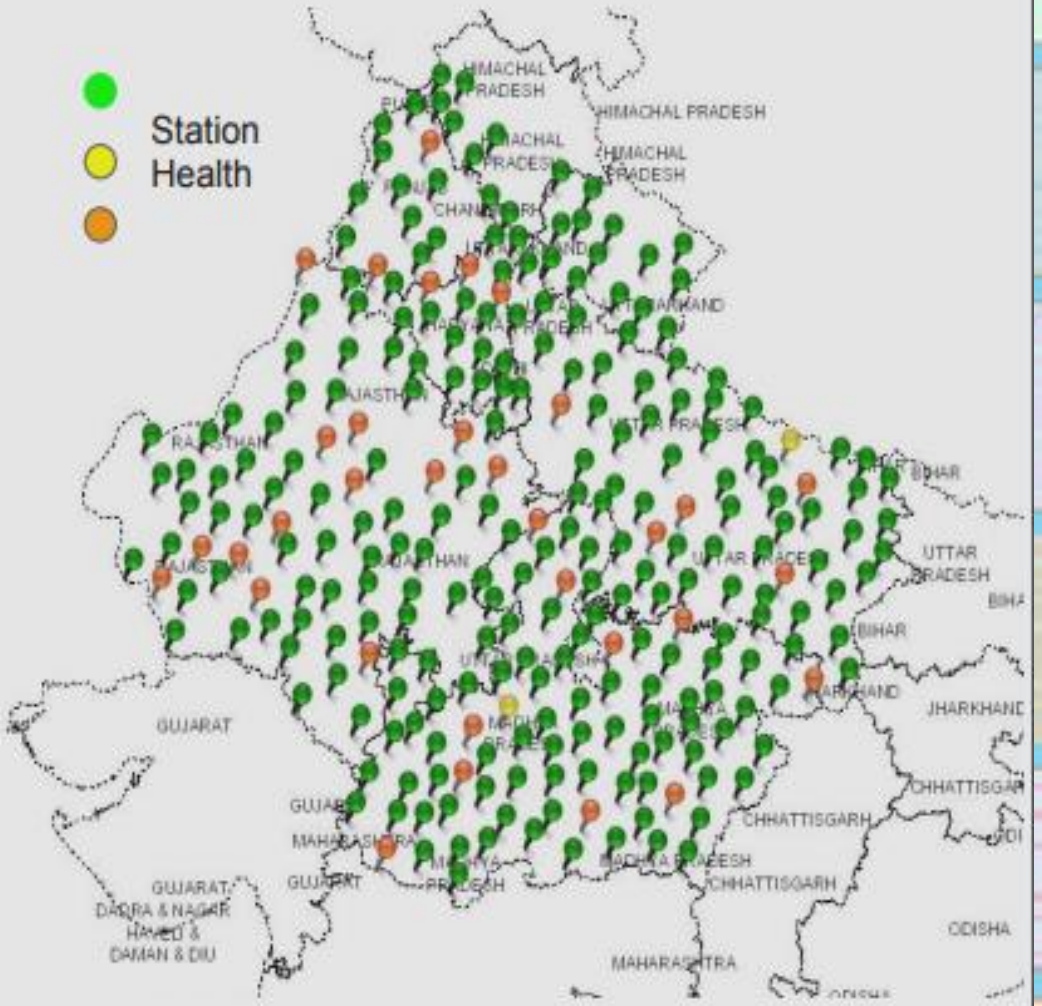
Need of a National Reference frame

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



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