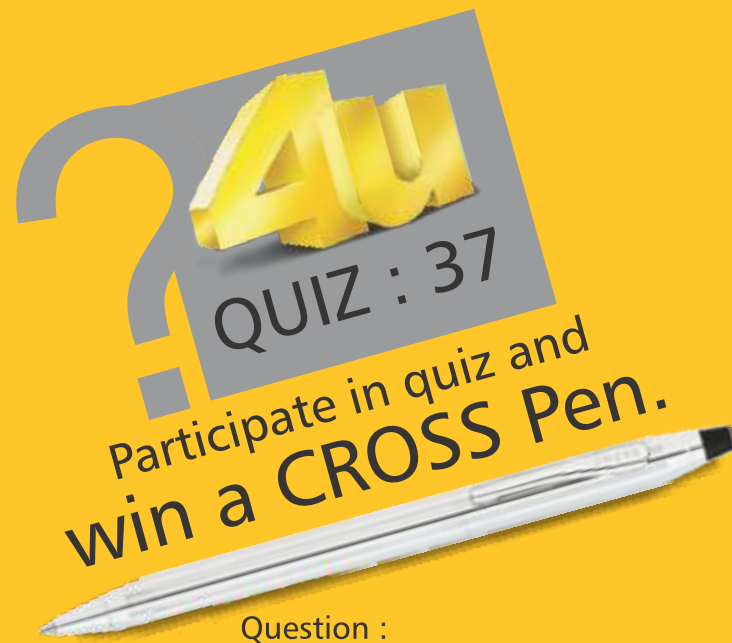




4U



Question :

Vicat's apparatus is used for

Options :

(A) fineness test

(C) setting time test

(B) consistency test

(D) soundness test

To send the right answer type : your Name, Option (Example : jigar patel, C) and send it to 7574880551

Last date to send the right answer : 31st August' 21

Name of the winner will be declared in the next issue.



Result of Quiz : 36
Right Ans.
(D) All the above
Winner : Mr. Dinesh Hirpara
Lucky draw done by
Mr. Manoj Lad (C M Associates - Bardoli)



Readers are requested to forward their valuable articles, views and suggestions to

The Editor - 4U, Care Services,
Sanghi Industries Limited

10th Floor, Kataria Arcade, Off S. G. Highway,

Post : Makarba, Ahmedabad - 380051, Gujarat - INDIA.

Ph. : 079 - 2683 8000 • Website : www.sanghiment.com

[Facebook.com/sanghiment](https://www.facebook.com/sanghiment) • [linkedin.com/company/sanghi-industries-ltd](https://www.linkedin.com/company/sanghi-industries-ltd) • [youtube.com/SanghiIndustries-Ltd](https://www.youtube.com/SanghiIndustries-Ltd)



HYDRODEMOLITION

From the Editor's Desk...



Dear Reader,
Here we are with the new issue of 4U with the whole lot of happenings and breakthrough technologies in the field of civil engineering. Glad to know that the articles are being well appreciated and enjoyed by all our aspiring technocrats.

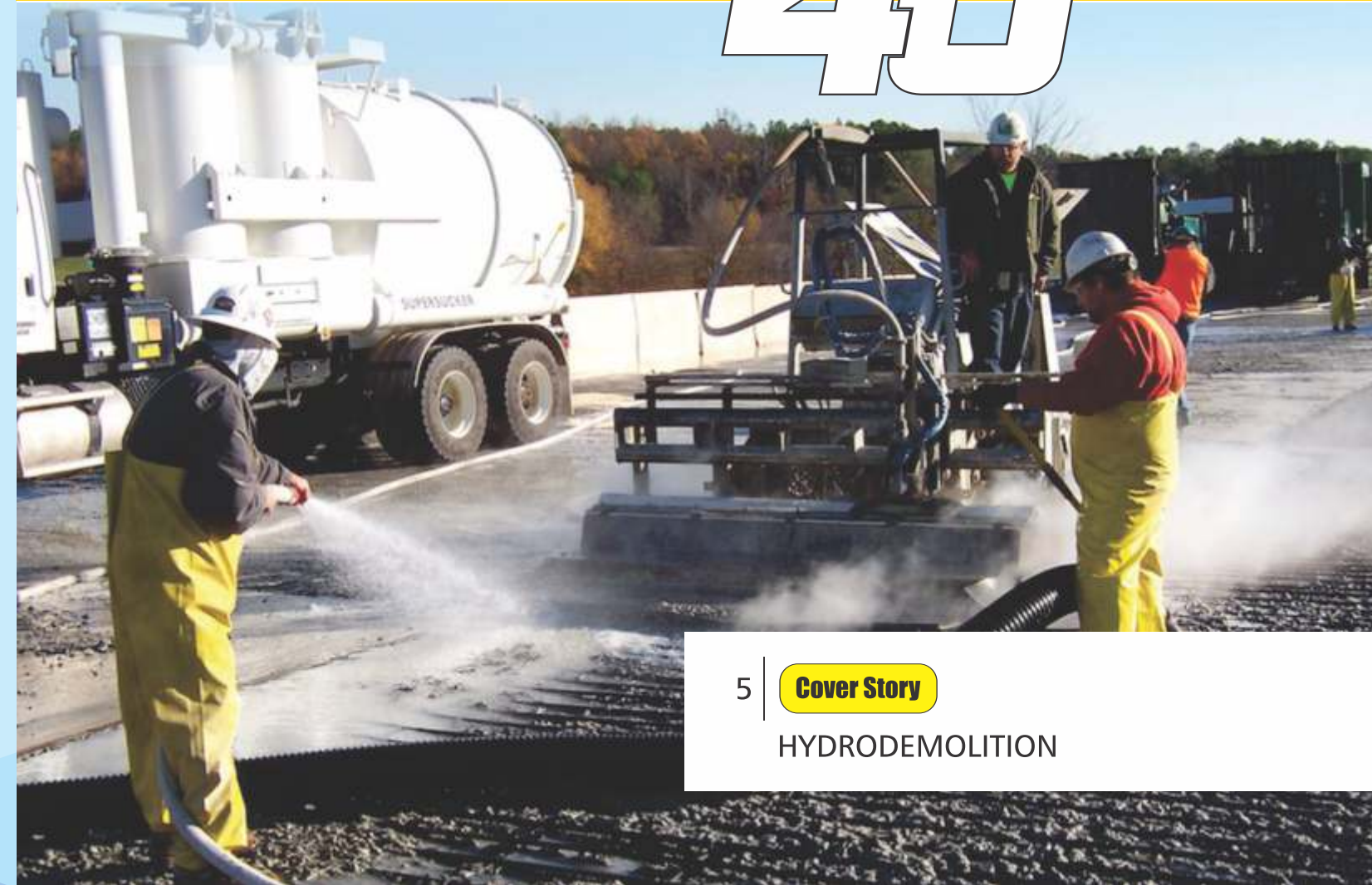
This time we take you to an educational journey of Hydro demolition Technique which is used to remove concrete and other materials using high pressure or ultra high pressure water jet. Compare to conventional demolition tools, Hydro demolition is an effective method to cut down concrete without affecting the substructure and other Part. Also covered topics like soil improvement method based on soil type.

We have come up with an interesting structure like Perot Museum of Nature & Science.

One can never be perfect. To improve upon our efforts to get you very interesting and new reads, we would request your support in form of suggestion and opinion on our 4U. We will be happy to receive them at nisarg.shah@sanghiment.com

Wish you happy reading....

Nisarg Shah
Editor - 4U Magazine
Care Services



5

Cover Story

HYDRODEMOLITION

7

Unique Structures

Tawang Monastery

Face-to-Face

8

Er. B. L. Salia



10

Case Study

BASE ISOLATED BUILDING SLD Essenza



12 | **Soil**

Soil Improvement Method Based on Soil Types?



14 | **Unique Structures**

Perot Museum of Nature & Science Morphosis Architects



16 | **Project Profile**

SANJAY HIRANI



18 | **Construction Methods**

Cold weather masonry construction



20 | **Monuments**

World Heritage Sites by UNESCO – Denmark



22 | **Health Tips**

Yoga for Stress Relief

23 | **Humour**

24 | **Design**

Rules for Design of Reinforced Concrete Column

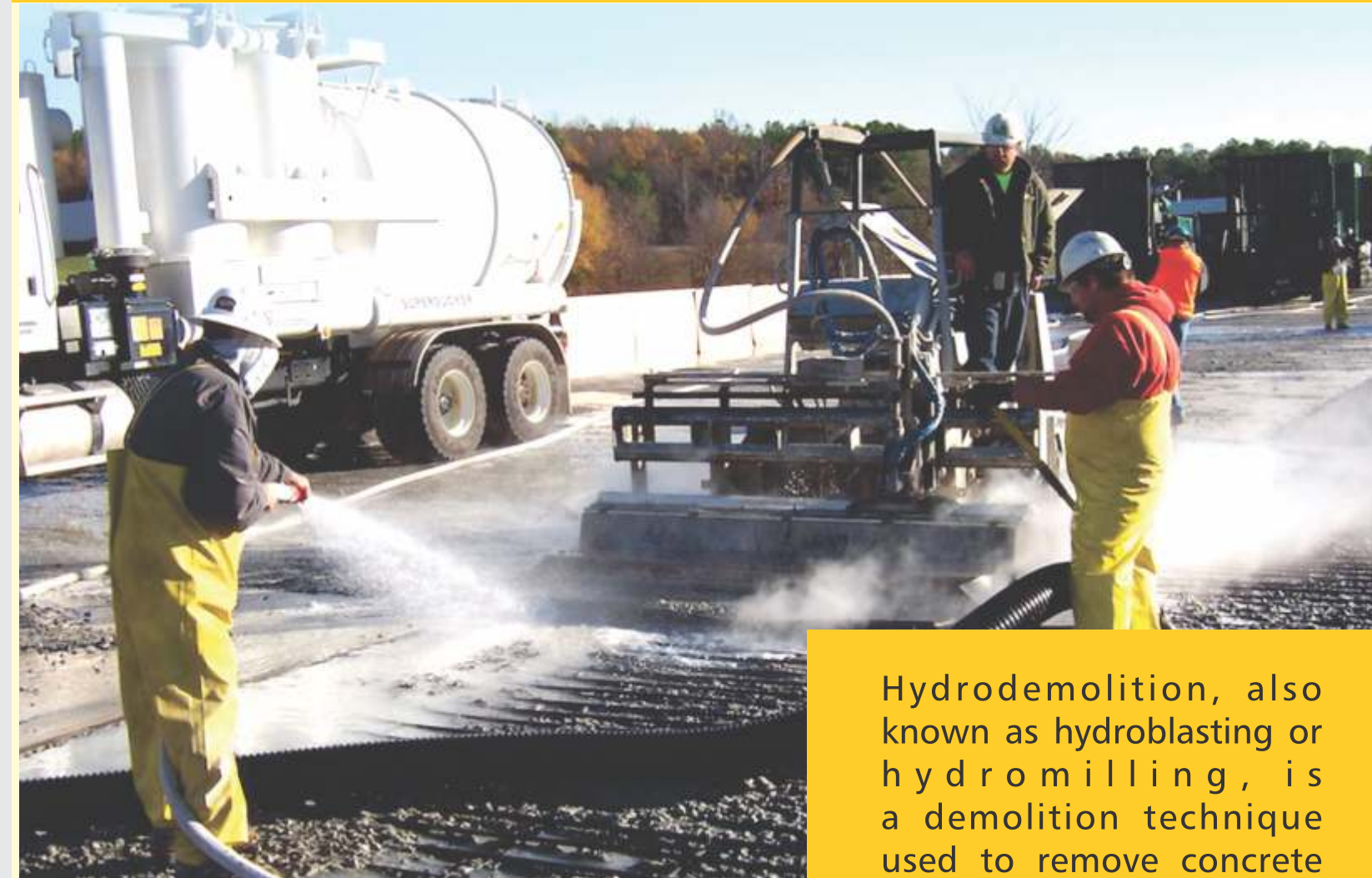
26 | **CURRENT AFFAIRS**

Rules for Design of Reinforced Concrete Column

28 | **Quiz**

Quiz - 37

HYDRODEMOLITION



Hydrodemolition, also known as hydroblasting or hydromilling, is a demolition technique used to remove concrete and other materials using high pressure or ultra high-pressure water jet. Compared to conventional demolition tools, hydrodemolition is an effective method to cut down concrete without affecting the substructure and other parts.

The hydrodemolition process does not involve vibrations, unlike other techniques. Hence, this method is accurate and has less impact on the surrounding materials. It is safe and reduces the risk of workplace injuries.

This article explores the historical background, essential features, and advantages of hydrodemolition in the construction industry.

History of Hydrodemolition

Researchers, McCurrich and Browne (1972) made the first serious attempt to use water jets for concrete hydrodemolition. They found that cutting of concrete using water jet consumes less energy. From the initial studies, they inferred the following results:

1. The aggregates in concrete were impossible to cut.
2. A practical site cutting tool will require pressure with a minimum value of 380 MN/m².

It then took them ten more years to overcome the abovementioned flaws and develop a commercial hydrodemolition unit. Contradictory to the above information, modern hydrodemolition systems work at operating pressures of about 100 MPa. It is 30% of the threshold suggested by McCurrish and Browne (1972).

Features of Hydrodemolition

Hydrodemolition, in general, can be called as a selective demolition method that involves removing damaged or low-strength concrete while keeping intact the healthy concrete. It is an efficient, cost-effective, and precise method that employs high-pressure water to remove deteriorated concrete.

Hydrodemolition is a safe and controlled solution for the removal of concrete. It has no risks of microcracks of the existing substrate compared with other traditional methods. It is widely used to prepare bridges before placing the deck overlay to achieve high bonding.

The process is much gentler to the environment. It involves pressure jetting, which is silent compared to heavy-duty equipment. This hence helps to reduce acoustic impact on the surrounding area. The water jet systems used in hydrodemolition are a zero-dust activity that reduce air pollution to negligible levels.

Working of Hydrodemolition

Hydrodemolition is performed using hydrodemolition machines that use either high-pressure or ultra-high pressure (UHP) water jets. This can be accomplished by three methods:

1. Hydroscarification
2. Partial depth removal
3. Full-depth removal

Ultra-high pressure water jets are used in hydroscarification, which involves the removal of the top layer of concrete. The depth generally falls between 1/4 to 3/4 inches.

Partial depth removal involves selective removal of concrete that has a depth greater than 3/4 inches.

Full-depth removal involves the demolition of the entire deteriorated concrete.

The high-pressure water jetting has a pressure of around 15,000 to 25000 psi, and UHP possesses pressures in the range of 25,000 to 55,000 psi.

The equipment used for hydrodemolition is automatic such as a robotic cutting tractor. These robots are programmed to control the water jets to facilitate uniform removal of concrete. Along with these robots, trailers and water pumps are used to collect and transport water.

Applications of Hydrodemolition

The major fields for application of hydrodemolition are:

1. Bridge and parking deck repair
2. Decommissioning
3. Decontamination
4. Construction joint cleaning
5. Road maintenance
6. Tunnel rehabilitation



Benefits of Hydrodemolition

The essential benefits of hydrodemolition are:

1. Reduced dust and noise pollution
2. Water collected can be treated and reused
3. Cost and time-effective method
4. No issues of microfractures after hydrodemolition
5. High-quality bonding surface
6. The selective demolition of R.C.C structures without affecting rebars
7. Reduced risks to the operators
8. Works great in confined spaces
9. Best suitable for industrial applications

Drawbacks of Hydrodemolition

Major drawbacks of hydrodemolition are:

1. High runoff issue is faced if the water is not collected and controlled correctly.
2. Hydrodemolition demands water and sewage requirements.
3. Increased risk assessment is necessary while performing hydrodemolition for vertical and overhead works.

Applications of hydrodemolition..

The main applications of hydrodemolition are:

1. Bridge and parking deck repair
2. Decommissioning
3. Decontamination
4. Construction joint cleaning
5. Road maintenance
6. Tunnel rehabilitation

Unique Structures

Tawang Monastery

Tawang Monastery, located in Tawang city of Tawang district in the Indian state of Arunachal Pradesh, is the largest monastery in India and second largest in the world after the Potala Palace in Lhasa, Tibet. It is situated in the valley of the Tawang Chu, near the small town of the same name in the northwestern part of Arunachal Pradesh, in close proximity to the Chinese and Bhutanese border.

Tawang Monastery is known in Tibetan as Gaden Namgyal Lhatse, which translates to "the divine paradise of complete victory." It was founded by Merak Lama Lodre Gyatso in 1680-1681 in accordance with the wishes of the 5th Dalai Lama, Ngawang Lobsang Gyatso. It belongs to the Gelug school of Vajrayana Buddhism and had a religious association with Drepung Monastery of Lhasa, which continued during the period of British rule.

The monastery is three stories high. It is enclosed by a 925 feet (282 m) long compound wall. Within the complex there are 65 residential buildings. The library of the monastery has valuable old scriptures, mainly Kangyur & Tengyur.



Er. B. L. Salia

Face-to-Face

Name of Firm : Bipin Salia & Associates

Address : A- 206 , City Centre Lal Darwaja, Station Road Surat - 395003

Mo : + 91 98251 25040

E-Mail : bipinsalia@gmail.com

Profession Affiliation and Association :

- Associate Member of Indian Institute of Engineers
- Chartered Engineer
- Registered as a Structural Engineer with SMC & SUDA
- Chairman at The Institute of Civil Engineers & Architect, Surat

Career Path :

- B.E (Civil), A.M.I.E.
- Bipin Salia & Associates, Established in Since 1991
- We have Completed more than 1500 projects

Mission :

- We Believe in Creating Client satisfactory designs & provide Excellent quality work giving keen interest.
- To Give Superior / Best to the Profession & Society.

Professional Gurus :

- Er. Nilesh Shah
- Er. Dipak Harsora

Landmark Projects :

- Dr. Kirtibhai Salia - Royal Park, Surat
- Atmiya Bungalows - Ankleshwar
- Adv. Gautambhai Desai - Farm House, Oviyan, Surat
- Er. Bhupendra Salia - Laxminarayan, Surat
- Jasmatbhai Dabhi - Textile Factory, RJD, Ichhapore
- Dream Festiva - Hotel, Gaurav Path, Surat
- Sheetal Mfg - Kakadiya Brothers - Diamond Factory, Surat
- Paladiya Brothers - Diamond Factory, Surat
- Kanani International Ltd., SEZ Sachin
- Kessi Group - Himatbhai Bhatia, Surat
- Aarya Luxury - Bungalows, Botad
- Ripinbhai Khatroja - River Palace, Surat
- Manishbhai Desai - Kailash Nagar, Surat
- Pramukh Gems - Diamond Factory, Surat
- Meet Lathiya - Textile Factory, Pipodra



Jasmatbhai Dabhi - Farm House @ Dumas



Ashadeep Vidhayabhavan - Surat



Pramukh Residency - Bardoli



Residence of Mr. Sandipbhai Kaswala - Surat



Residence of Mr. Himmatbhai Bhatia



Residence of Mr. Ankurbhai Savani



BASE ISOLATED BUILDING SLD Essenza



Project Overview
Project: Essenza Base Isolation building Location: Bharuch, Gujarat, India
Builder : SLD Infrastructure, Bharuch. Organization
Structural Consultant: Ezitech Structural Engineers Pvt. Ltd.

About Company: Ezitech Structural Engineers Pvt. Ltd. is Civil/structure design engineering firm run by Taher Tinwala, located in Fatehgunj, Vadodara, India. Deal in analysis, design, drawing and estimation of Industrial engineering Projects working since last 13 years. The role of our organization is to do civil and structure design of the building using base isolation technic to increase the performance of building in seismic activity. Project Importance: The building has been designed using the base isolation system in such way that dampers will absorb all vibration forces. The functionality of building will not change after seismic activity. Hence base isolation is introduced in Ground floor slab level.

EZITECH STRUCTURAL ENGINEERS PVT. LTD.
322 to 324, Blue Diamond Commercial,
Beside Fatehgunj Petrol Pump, Vadodara- 390002, Gujarat, India
M.no. +91 9662377521, +91 265 2786006
E-mail id : taher.tinwala@ezsce.com

Understanding Concept of Damping

1. When a structure is excited by an external force, it starts vibrating and continues to do so with decreasing amplitudes if no further force is applied.
2. The structure finally comes to rest.
3. The process by virtue of which this happens is known as "Damping".
4. In Building Structures damping arises from many sources like friction between different structural components, opening and closing of microcracks in concrete, friction between structural components and non-structural components etc.
5. Usually, it is difficult to quantify damping with a reasonable accuracy in real buildings.
6. Typically for concrete buildings damping is considered as 5% of critical damping.
7. Critical damping is that when there is no oscillatory motion the structure and it comes to rest after excitation.

Understanding Ductility

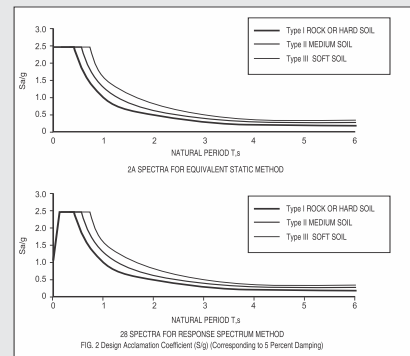
1. Ductility arises from sources like
 - Inelastic material behaviour
 - Detailing of Structural Component (for example the structure may have a much higher redundancy i.e. many load paths.)
 - Choice of ductile collapse mechanism. For example allowing beams to yield first. Columns allowed to yield only at base level
2. The effectiveness of this philosophy has been established from the observed behaviour of buildings in past earthquakes
3. Thus, the Earthquake Resistant Design Procedure is
 - Design for smaller forces as outlined in the code

- Design and Detail Structural Components for Ductility
- Construct the Building Correctly

HOW BASE ISOLATION WORKS?

We know that For any building

- Earthquake forces generated are related to its period
- In general, lower the fundamental period higher the earthquake induced forces but smaller displacements.
- Consider the Acceleration versus Period Curve for code specified earthquake loads given in the enclosed image.
- For a building with period of 0.5 Sec. Code specified acceleration value is much higher than that for say 2.5 second time period
- This interface called isolator exists between Structure and Foundations.



PRACTICAL BASE ISOLATION

Thus practical approach to Base Isolation is

- Lengthen the Time Period To reduce EQ force demand
- Control the displacement by introducing additional damping elements.

Thus, most of the displacement and dissipation of seismic energy takes place in the isolator itself.

As a result, much smaller earthquake induced forces are transferred to the structure.

Superstructure behaves as Elastic!

Though there are several devices but the most common devices are

- Laminated Rubber Bearings and Laminated Rubber Bearings with Lead Plug
- Friction Pendulum System based on sliding concept

OBJECTIVES OF SEISMIC ISOLATION SYSTEMS

- Enhance performance of structures at all hazard levels by.
- Minimizing interruption of use of facility (immediate Occupancy performance Level)
- Protection of Building Frame
- Protection of Non- Structural Components & its Contents
- Reducing damaging deformation in structural and non-structural components.
- Provide for an Operational facility after the Earth quake
- Reducing acceleration response to minimize related damage
- Protection of Life safety of occupants.
- Improvement for safety of Building.
- Preventing plastic deformation of structural elements

PRINCIPLE OF BASE ISOLATION

The Concept of separating the structure from the ground to avoid earthquake damage is quite simple to grasp. After all, in an earthquake the ground moves and it is this ground movement which causes most of the damage to structures. An airplane flying over an earthquake is not affected. So, the principle is simple. Separate the structure from the ground. The ground will move but the building will not move.

OVERVIEW OF LEAD RUBBER BEARING

What is Lead Rubber Bearing (LRB)

- Rubber Bearings consist of alternate layers of vulcanized rubber and steel laminates with a central lead core. Two inner top/bottom steel plates of required thickness are attached with external anchor plates by counter bolts.
- In lead rubber bearings, the lead plug deforms plastically and thus dissipates energy through hysteretic damping up to 30%.

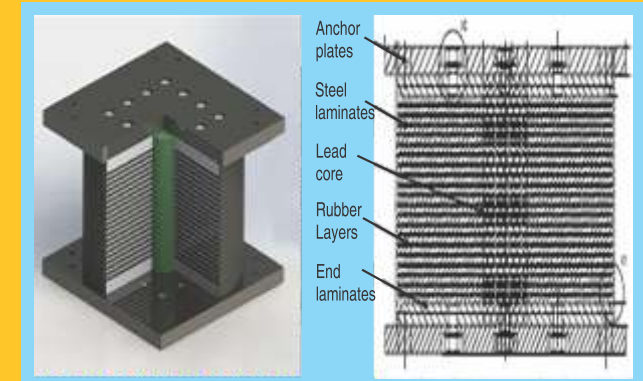
The Below Graph represents following:

- 1) Response spectrum with specific damping
- 2) Response spectrum for different damping The combined isolation and energy dissipation functions in a single compact unit. In terms of seismic protection, this is a crucial aspect to minimize the seismic energy flow to the superstructure and to limit the horizontal displacements of the isolators.

Shifting of period to meet a target natural frequency in seismic event.

LRB is a highly technical solution for isolation & damping

- An effective solution for base isolation The main objective of seismic isolation system is to safely withstand the devastating forces of seismic ground movements. Lead rubber bearings are mainly used as seismic isolator. It is placed between foundation and superstructure.
- Provide an adequate level of energy dissipation: In order to control the displacements that otherwise could damage other structural elements.
- Re-centering capabilities : Even after a severe earthquake so that no residual displacements could disrupt the serviceability of the structure.
- Horizontal flexibility : Provide enough horizontal flexibility in order to reach the target natural period for the isolated structure.



In lead rubber bearings, the lead plug deforms plastically and thus dissipates energy through hysteretic damping up to 30%.



Pictures of Installed Lrb's At Essenza

Isolation of stairs from superstructure



Lift shaft at ground level is hanged from the first floor and has no connection with the ground, in case of an earthquake the lift would suffer minimal or no damage.



The corners are held by 4 restrainers at each corner, and are designed to take impact and load of the whole building in case the earthquake's magnitude is more than the design parameters

Soil Improvement Method Based on Soil Types?

The selection of soil improvement method is governed by several factors like soil type, equipment availability, cost, construction period, skills, and past experiences. Soil type is one of the critical factors that can influence the selection of one soil improvement method over another.

The soil type alters both the effectiveness and cost of the soil improvement technique. Some of the soil improvement methods are soil replacement, grouting, preloading, site strengthening, and geosynthetics.



How to Select Soil Improvement Method Based on Soil Types?

1. Soil Replacement

The soil replacement method is applicable for soft soil. There are two primary techniques for soil replacement: removal and replacement of the soil and soil displacement.

The former is suitable for any soft or weak soil, provided that the soft soil layer is near the surface, groundwater can be lowered economically or the soil layer is located above groundwater, and the weak soil thickness is not greater than 9 m.

It involves the removal of soft soil and replacing it with structural fill during grading operations. Soil displacement includes overloading very soft soil until it shears and is displaced by firmer fill.

2. Water Removal

The water removal method is appropriate for sites with an underlying compressible cohesive soil layer. There are four techniques by which water is removed from the soil to improve its strength: 1. Trenching technique 2. Preloading technique 3. Preloading with vertical drain 4. Electro-osmosis

2.1 Trenching Technique

Excavation of trenches on the construction site facilitates water drainage. It is suitable for soft, fine-grained soils and hydraulic fill. It is appropriate for a depth of 3 m. The speed of the process relies on trench spacing and the soil. The

removal of water from the soil layer above the soft ground would reduce settlement on the construction site.

2.2 Preloading Technique

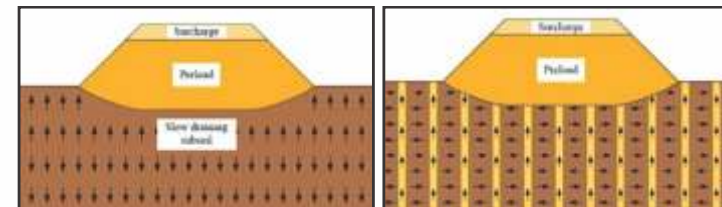
It includes the use of loads to consolidate the soil layer before the commencement of the construction work. Preloading is suitable for normally consolidated fine-grained soil, organic soil, and fills. It is cost-effective but needs a long time to achieve adequate consolidation.

2.3 Preloading with Vertical Drain Technique

It includes the use of loads combined with a vertical drain to consolidate the soil layer before the start of the construction work. Preloading with vertical drain is suitable for normally consolidated fine-grained soil, organic soil, and fills. It is useful for a depth not more than 30 m.

2.4 Electro-osmosis

It is suitable for normally consolidated clay and silty clay. It can be used in a confined area, and is the best choice for



small areas. Electro-osmosis is fast but expensive at the same time. It is not suitable for conductive soil layers.

3. Site Strengthening Methods

There are a number of site strengthening methods from which engineers can select a suitable technique based on equipment availability, cost, local experiences, etc. Different types of site strengthening methods are described below:

3.1 Dynamic Compaction

Dynamic compaction is an efficient and cost-effective soil improvement technique that uses the dynamic effect of high energy impacts to densify weak soil. The dynamic effect is generated by dropping a static weight (15-40 tonnes) from a defined height (10-30 m). It is the best choice for cohesionless soil, and possibly suitable for soils with fines.



Dynamic compaction is not appropriate for cohesionless soils below the groundwater table as it may damage adjacent structures. It is recommended to use this method for a maximum depth of 18 m.

3.2 Vibro-compaction

It is appropriate for cohesionless soils with less than 20% fines, and useful for 30 m depth.

3.3 Vibro-replacement

It is suitable for soft cohesive soil and is considerably expensive. The vibro-replacement technique includes the use of jetting and vibration to penetrate and remove soil, and then the placement of compacted granular fill into a hole to create columns surrounded by undisturbed soil.

3.4 Vibro-displacement

The vibro-displacement technique is suitable for stiffer cohesive soil and involves the use of jetting and vibration to penetrate and displace soil, and then the placement of compacted granular fill into a hole to create columns.



4. Grouting

Grouting is the injection of grout into the ground to fill underground voids, joints, and fractures and consequently improve soil strength.

4.1 Injection of Grout

It is applicable for a broad spectrum of coarse and fine-grained soils. Expansive grouts are necessary to grout finer grain soils. The injection of grouts reduces the permeability of the soil strata.

4.2 Deep Mixing

It includes the use of jetting or auger to mix the soil with grouts. It is a useful option for a broad spectrum of coarse and fine-grained soils for a depth of nearly 52 m. Deep mixing is a wrong choice for highly cohesive clay and some gravelly soils.

5. Thermal Method

Heating and freezing are two techniques to improve the soil properties. The former is suitable for cohesive soil, whereas the latter is applicable for soil types below the groundwater table and cohesive soil above the groundwater table.

The heating process generates irreversible strength, but the need for high energy restricts its practicality. Freezing reduces permeability and increases the bearing capacity of the soil. It is suitable for tunneling and excavation to reduce or stop the inflow of groundwater.

6. Geosynthetics

The geosynthetic materials can be used for erosion control, filter, drains, water barrier & soil reinforcement. It is an effective filter for all soil types and reinforcement for soft soil.

Unique Structures

Perot Museum of Nature & Science Morphosis Architects

The building created by Mayne's Santa Monica, Calif.-based firm, Morphosis Architects—a gleaming white cube pierced with irregular apertures and striations—seems like a giant billboard for the future conspicuously perched atop a landscaped bluff just north of downtown Dallas.

The building's facade is composed of roughly 700 individually molded concrete panels, their ridged contours suggestive of a geological formation; the majority is opaque to provide a black-box environment for the exhibit halls inside, but the southwestern side is punctuated by a slash of a glass-enclosed escalator. Visitors arrive at a lower-level entryway, which is connected to a planted forecourt and topped by a sloping terrace covered in rocks, cacti, and dry grass—a model, in miniature, of the native Texas ecosystem.

Inside, visitors can explore a 300-seat digital movie theatre, a museum store, 14 stories of exhibition space that include a children's museum, and a dedicated space for travelling exhibitions; there are also offices and auxiliary facilities for museum staff. Mayne and company have always been dedicated to a belief that design is a place to try out possible futures, and in this project - devoted to the exploring, inventive spirit of science - Morphosis' material and tectonic daring seem to speak more clearly than ever before.



Project Profile

SANJAY HIRANI

Firm Name : Sanjay Hirani Design Associates
Address : 405, Swara Park Lane,
Opp. to Joggers park, Atabhai Road,
Bhavnagar - 364002, Gujarat, India
Email : sb_hirani@yahoo.co.in
Phone : +91-9825205126
Date of birth : 11-9-1965

- 1. Private Residence , VAPI (residential project)**
A cubical play with exposed concrete and front façade treated with precast terracotta jali with walls finished with white texture paint.
- 2. Private residence, BHAVNAGAR (residential project)**
Forms being composed and materialised with stone masonry and white texture walls.
- 3. Commercial + Pent house , BHAVNAGAR**
Elevational treatment by using Black texture and window screening with Aluminium Composite Panels (ACP) makes a graphical representation of a commercial with a residential touch.

- 4. Private residence, SURAT**
Stone tiles cladding and CNC screening with High Pressure Laminates (HCP) for a graphical composition of a residential façade.
- 5. Shree dan resort, Sarangpur**
Stone cladding and Fabrication canopy structure finished with wooden effect Aluminium Composite Panel(ACP)
- 6. Shree dan resort, SARANGPUR**
Deck floor finished with wooden effect tiles



Every design should be a result of an intense process which should amalgamate passion and purpose, dreams and desires. Only a true labour of love is capable of manifesting true functional design. Sanjay Hirani Design Associates' firm is one of its kind based in Bhavnagar District of Gujarat, established back in the year 1992.

We truly believe in executing in the favour of client's aspirations and desires, creating a balance between their needs and wants. We are majorly engaged in residential design and interiors, along with hospitality and commercial projects.

Such is the philosophy of the firm where design is an experiment of varied materials, textures and elements which can create experiential qualities to designed spaces. We truly believe in aesthetics and functionality of every project, incorporating new innovations and ideas which can further enhance the design quality.



Cold weather masonry construction

Cold weather masonry construction demands several precautions to be taken by the builders. To avoid seasonal delays associated with cold weather construction, the builder or contractor employs dynamic procedures, equipment, mason contractors, supplies, etc.

As per ACI 530.1-08/ASCE 6-08/TMS 602-08, "Specification for Masonry Structures" provides the minimum requirements for cold weather masonry construction. Masonry construction must be carefully prepared at sites with temperature less than 44oF or 4.4oC. Cold weather changes the properties and behavior of the mortar used for masonry, finally leading to cracking and other damaging issues. Hence, masonry construction during cold weather requires special steps to keep the mortar warm and workable.

This article provides insights into the effects of cold weather on mortar and tips to follow for masonry construction during cold weather .



Effect of Cold Weather on Masonry Mortar

Low temperature of the surrounding reduces the temperature of the mortar below normal, which causes the following effects:

1. As the temperature of the mortar falls below normal, the water freezes and causes a volume change, this would result in mortar expansion. Hence, the quantity of water required to reach a given consistency reduces.
2. The hydration process and strength gain of the mortar mix is reduced during lower temperatures.
3. The initial and final setting time of the mortar are significantly delayed.
4. The freezing of water present in the mortar is just enough to lead to cracks in the mortar. The presence of ice on the surface of masonry units restricts the bond between the mortar and brick units.
5. The rate of strength gain of mortar during cold temperature is reduced.

Tips to Work with Masonry and Mortar in Cold Weather

The general tips to follow while performing masonry construction during cold weather include:

1. The selection of masonry materials for cold weather performance must be optimized.
2. Protecting the raw materials from ice and cold weather.
3. Heating the material and mortar during its application.
4. Insulating the structures during curing.
5. Protecting or enclosing the work areas.
6. Protect the workers at the site.

The workers seem to be less productive during cold weather. The workers working within a protected area were found to work until 12°F to 2°F as per a field observation conducted by the Portland Cement Association (PCA). A better working area for mixer operators can improve their productivity drastically.

Storing and Handling Materials for Masonry Construction in Cold Weather

1. All the materials used for masonry construction must be prevented from rain and snow. For this, the materials can be placed on planks and covered using tarps.
2. Always select mortar ingredients that are delivered in bulk and dry.
3. The fine aggregates delivered may contain frozen lumps. These can be heated and broken into sand.
4. The masonry units must be placed over unfrozen surfaces. The temperature of the surface must not be less than 20°F. It must be free from ice and snow.
5. Always heat the masonry materials before construction. This facilitates cement hydration.
6. The mortar must be placed on heated surfaces like metals so that that freezing can be prevented.
7. Glass masonry units must not be installed during cold periods.

Mixing Mortar for Cold Weather Masonry

1. Mix the mortar in smaller amounts. It would stop the materials from absorbing the water. Hence, frosting is restricted.



2. Mortar is placed by heating and maintaining temperature. Do not let the mortar undergo excessive drying due to external warming.
3. The sand or water used for mortar can be heated and mixed. It would help in maintaining the mortar temperature below 40°F.
4. If hot water is used, first mix it with cold sand before adding cement. This is done to avoid flash setting of the cement.
5. The rate of hydration can be increased by employing high-early cement. An accelerator or admixture can be used to serve this purpose. Accelerators are used to increase the rates of early-age strength development. Hence, they do not let the mortar freeze for a shorter period to facilitate the gain of early strength. The details regarding the accelerators and admixtures that are used in masonry mortar are given in ASTM C1384.
6. As per ASTM C 270, admixtures cannot be used unless specified in the project details. Another method that can be used to increase the reaction rates of mortar in cold temperature is by using fineness cement like ASTM C 150 Type III.

Protecting New Masonry Structures from Cold Weather

1. Once the masonry construction is over, cover the walls with plastic. Plastic prevents water from entering into the masonry during temperatures less than 32°F.
2. Temperatures between 32°F and 20°F can result in heat loss. This can be prevented by covering the wall with insulation blankets.
3. When the temperature in the area is between 20°F and 0°F, the walls must be maintained at around 40°F. It can be performed by a 1-inch insulation blanket. Both sides of the masonry wall can be used to heat.
4. Windbreakers can be installed if the wind speed in the area is higher than 15 miles per hour.

The main goal of cold weather construction plan is to reduce and eliminate the undesirable effects of cold weather on masonry materials, construction and workforce in a cost-effective manner. The mason contractor must evaluate the effectiveness and practicality of the techniques employed concerning the specific project and weather conditions.

World Heritage sites by UNESCO France



Amiens Cathedral

Located in the Hauts-de-France region, in the Department of the Somme, Amiens Cathedral is one of the largest churches in France and one of the most complete 13th century Gothic churches. The rigorous coherence of its plan, with the perfect symmetry of the nave and choir on either side of the transept, the beauty of its three-tier interior elevation, the audacious lightness of its structure that marks a new stage towards the conquest of luminosity, the wealth of its sculpted decoration and its stained glass makes it one of the most remarkable examples of medieval architecture.



Palace and Park of Fontainebleau

Used by the kings of France from the 12th century, the hunting lodge of Fontainebleau, standing in the heart of the vast forest of the Ile-de-France in the Seine-et-Marne region, was transformed, enlarged and embellished in the 16th century by King François I, who wanted to make it a "new Rome". Surrounded by an immense park, the palace, to which notable Italian artists contributed, combines Renaissance and French artistic traditions. The need to expand and decorate this immense palace created the conditions for the survival of a true artistic centre.



Bourges Cathedral

Bourges, the ancient Roman city of Avaricum, located in the Centre-Val-de-Loire region, was one of the first Christian communities of Gaul. The cathedral, which was dedicated to the first Christian martyr, Saint Etienne, occupies the site of a place of worship since the 3rd century. Built between the late 12th and late 13th centuries, it is one of the great masterpieces of Gothic art, and admired for its proportions and the unity of its design. Its tympanum, sculptures and stained-glass windows are particularly striking. Apart from the beauty of its architecture, it bears witness to the power of Christianity in medieval France.



Pitons, cirques and remparts of Reunion Island

The Pitons, cirques and remparts of Reunion Island site coincides with the core zone of La Réunion National Park. The property covers more than 100,000 ha or 40% of La Réunion, an island comprising two adjoining volcanic massifs located in the south-west of the Indian Ocean. Dominated by two towering volcanic peaks, massive walls and three cliff-rimmed cirques, the property includes a great variety of rugged terrain and impressive escarpments, forested gorges and basins creating a visually striking landscape. It is the natural habitat for a wide diversity of plants, presenting a high level of endemism. There are subtropical rainforests, cloud forests and heaths creating a remarkable and visually appealing mosaic of ecosystems and landscape features.



YOGA

FOR STRESS RELIEF



Getting the Most Out of Yoga

When you're in a yoga pose, think about how you can unite your body, mind, and breathing. Even a simple pose like mountain pose is a stress reliever when you focus on keeping your breathing slow and even, and visualize yourself as firm and steady as a mountain.

Stay 'in the moment.' When we're under stress, we're often thinking about what we need to do in the future ("I have to cram for that test") or what we could have done better in the past ("I wish I hadn't said that!"). Instead of letting your thoughts wander as you do yoga, think about what your body and breath are doing in this moment. Notice how a particular muscle or area of the body feels. Focus on breathing in slowly as your body stretches tall, and breathing out slowly as you curl up.

Being in the moment like this helps you build your ability to focus and concentrate, which helps in all aspects of life.

Use your breathing when things get difficult.

When to Try Yoga

You can incorporate mini-bits of yoga into your daily life to help you manage stressful moments. Here are some ideas:

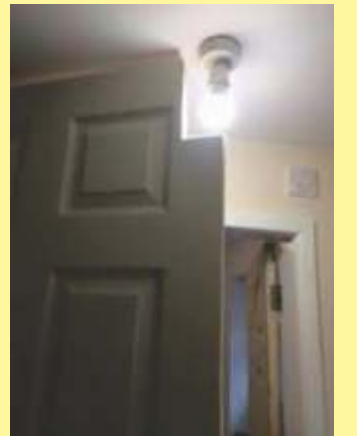
- **Before a test.** Do easy neck and shoulder rolls right at your desk to relieve tense muscles in your neck, shoulders, and back. Also try squeezing and relaxing your fingers and hands. These exercises can

take as little as 30 seconds, and can be repeated as often as you need!

- **While studying.** Try a few simple yoga moves to help relax any areas that may have become tense while studying. Neck and shoulder rolls can release tension in your back and shoulders. Forward folds and twists will relieve lower back strain. Give your face a mini-massage to help loosen up a tense jaw. Balancing poses, like tree pose, can help focus your energy so you can concentrate on what you need to do!
- **Before bed.** Do a few yoga stretches before bed to help you relax — especially if you have a lot on your mind. Poses where you fold forward, like child's pose, tend to be calming. They allow you to tune out the rest of the world and feel quiet and peaceful. Stay in a forward fold for 3 or 4 full, slowing breaths, and allow your body and mind to relax.



HUMOUR



Rules for Design of Reinforced Concrete Column



The design of reinforced concrete (RC) column is carried out by following certain procedures. However, some specific rules and requirements need to be met. The conditions are commonly related to reinforcement ratio, size of rebars, spacing of steel bars, size and spacing of lateral ties or spirals, thickness of concrete cover, number of steel bars, and dimensions of the column.

The requirements or specifications related to the RC column design are commonly provided by codes such as ACI 318-19, IS 456, etc.

Tips and Rules for Design of Reinforced Concrete Column

1. Dimensions of Column's Cross-Section

1. According to ACI 318-19, the limitation on minimum dimension for columns is not imposed to allow reinforced concrete columns with a small cross-section in lightly loaded structures, such as low-rise residential and light office building.
2. There is a great need for careful workmanship if a small cross-section is used for the column.
3. For practical purposes, it is desired to have the column's cross-section as a multiple of 5 cm.

2. Longitudinal Bars

Longitudinal reinforcement are the main bars in the RC column. They are arranged in square, rectangular, or circular pattern.

2.1 Minimum and Maximum Reinforcement Ratio

1. According to ACI 318-19, section 10.6.1, the area of longitudinal reinforcement should not be less than $(0.01 \cdot A_g)$, and not greater than $(0.08 \cdot A_g)$. Where

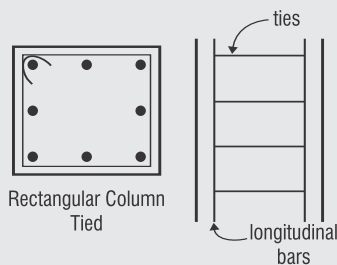
" A_g " is the gross cross-sectional area of the column.

2. The minimum reinforcement ratio of $(0.01 \cdot A_g)$ provides resistance against bending moments not accounted for in the analysis. It also reduces the effects of creep and shrinkage of the concrete under sustained compression.
3. A reinforcement ratio higher than $(0.08 \cdot A_g)$ is economically and practically undesirable as it leads to steel congestions that hinder proper placement and concrete consolidation.
4. The congestion is highly probable in regions where steel needs to be spliced. Steel congestion may lead to the formation of honeycomb in concrete.
5. The majority of columns are designed with a maximum reinforcement ratio of $(0.04 \cdot A_g)$. This considerably reduces the chance of congestion.
6. The use of large steel bars can reduce steel congestion.

2.2 Number of Longitudinal Bars

According to ACI 318-19, section 10.7.3, the minimum number of bars for concrete columns are as follows:

1. Four within rectangular or circular ties.
2. Six enclosed by spirals or for columns of special moment frames held by circular hoops.



3. Three within triangular ties

Note:

- For columns with large axial forces and small moments, longitudinal bars should be spaced more or less uniformly around the perimeter.
- If bending moments on the column is large, much of the longitudinal steel rebars are concentrated at the highest compression or tension faces, i.e., at maximum distances from the axis of bending.

2.3 Thickness of Concrete Cover

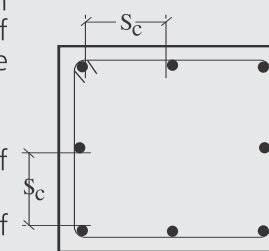
The minimum thickness of concrete cover is 40 cm. However, it may be required to be increased if in special circumstances or when general building code needs greater concrete cover for fire protection:

1. For columns that are cast and permanently in contact with the ground, the minimum cover is 7.5 cm.
2. For columns exposed to weather or contact with the ground and embedded bars are No. 19 or greater, the minimum concrete cover is 5 cm.

2.4 Spacing Between Longitudinal Bars

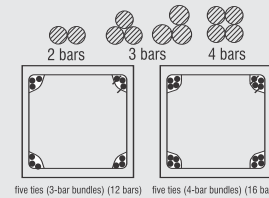
The spacing between longitudinal reinforcement of the column should be the greatest of the following:

1. 4 cm
2. 1.5 times the diameter of the longitudinal bar
3. $(4/3)$ times the diameter of maximum aggregate size



2.5 Bundled Bars

1. Bundled bars are groups of parallel bars that are in contact with each other to act as a unit bar. It is used where a heavy concentration of reinforcement is required. Bundled bars save space and reduce congestion for placement and compaction of concrete.

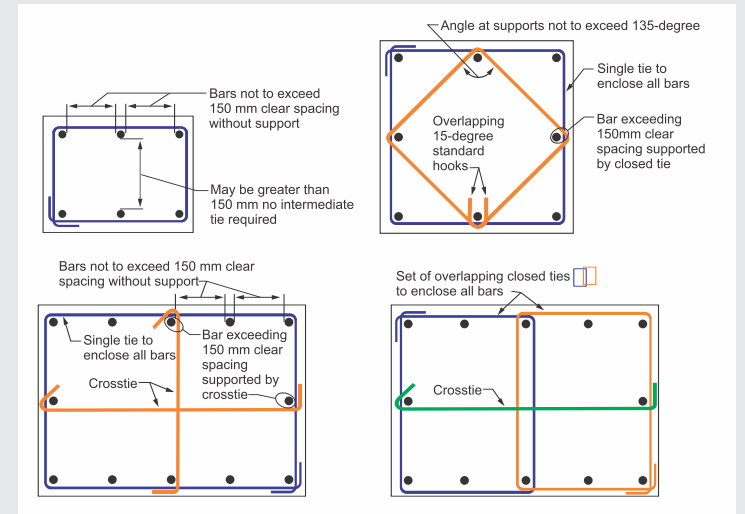
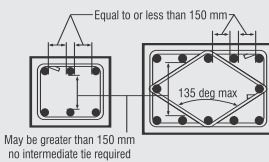


2. The maximum number of bundled bars are four.
3. Bundled bars shall be enclosed within transverse reinforcement.

3. Transverse Bars

3.1 Ties

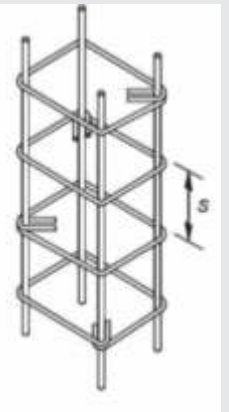
- Ties shall be arranged in a way that every corner and alternate longitudinal bar shall have lateral support provided by the corner of link having an included angle of not more than 135 degrees.
- Transverse ties shall not be farther than 150 mm clear on either side from laterally supported longitudinal bars.
- Ties for columns must have a minimum diameter of 10 mm to enclose longitudinal bars of No. 32 or smaller and a minimum diameter of 12 mm for larger bar diameters.
- Spacing of ties shall not exceed the smallest of:



1. 48 times the tie diameter
2. 16 times the longitudinal bar diameter
3. The least dimension of the column

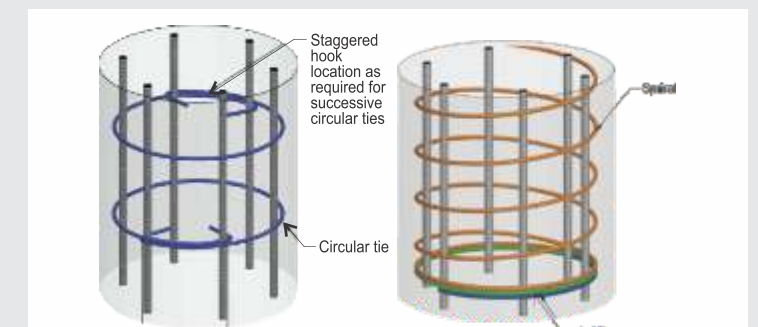
3.2 Circular Individual Ties

Circular ties should be used where longitudinal bars are located around the perimeter of a circle.



3.3 Spirals

- For cast-in-place construction, the spiral bar should not be less than No. 10 bars.
- Minimum clear spacing is the greatest of 25 mm or $(4/3)$ times the diameter of aggregate.
- Maximum clear spacing of 75 mm.
- 1.5 extra turns of spiral bar should anchor spirals at each end.



YUVA – Prime Minister’s Scheme for mentoring young authors



YUVA is an Author Mentorship programme which will train young and budding authors aged below 30 years in order to promote reading, writing and book culture in India. It will also project India and Indian writings worldwide.

YUVA stands for “Young, Upcoming and Versatile Authors”. The scheme is in line with PM’s vision of encouraging young writers to write about India’s freedom struggle. Call on young generation to write about freedom fighters was taken in

PM’s Mann ki Baat in January 2021. YUVA is a part of India@75 Project which seeks to bring perspectives of young generation of writers on themes including Freedom Fighter, Unsung Heroes, Unknown and Forgotten Places etc.

Hong Kong woman breaks record for fastest ascent of Everest

Hong Kong mountaineer, Tsang Yin-hung, recorded “world’s fastest ascent of Everest by a woman” in just 26 hours.

Tsang climbed 8,848.86-metre mountain in a record time of 25 hours and 50 minutes in her third attempt.

- Earlier in 2017, Tsang became first Hong Kong woman to climb the top.
- She broke the earlier record of Nepali women Phunjo Jhangmu Lama completed the climb in 39 hours 6 minutes.



Global Annual to Decadal Climate Update



Global Annual to Decadal 10-year Climate Update was released by United Kingdom’s Met Office led by World Meteorological Organisation.

Key Findings

- According to the release, world will temporarily breach 1.5-Celsius warming mark within 2021-2025.
- It highlights, there is 40 percent chance of annual average global temperature will surpass 1.5C above pre-industrial temperatures, the warming limit of Paris climate accord.

- There is a 90 percent chance of one year in period of 2021-2025 being hottest on record.
- Annual average global temperature will be at least 1C warmer than pre-industrial levels between 2021-2025.

While all efforts are made to ensure that the information published is correct, Sanghi Industries Limited holds no responsibility for any unlikely errors that might occur. The information published here is provided for the reference of readers. However readers are cautioned to take decisions after consulting experts on the subject. Sanghi Industries Limited holds no responsibility for any decision taken by readers on the basis of information provided herein.



>90% Superior Quality
of limestone purity

100% Superior Consistency
Robotic Technology

22+2 Fast Construction
MPa One Day Strength

<314 Crack Free Construction
KJ/Kg Heat of Hydration at 28 Days

CCC Information Related to Construction
Consumer Care Centre

Turning Dreams into Concrete Reality