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2015-16 தென்னக மய்ய புதிய நிர்வாகிகளை வாழ்த்துகிறோம்

உள்ளே

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ஆசிரியர் மடல்

மு. மோகன்

வணக்கம்

2014ம் ஆண்டு விடைபெற்றது.

சென்ற வருடம் கட்டுமான தொழில் மிகவும் மந்த நிலைக்கு சென்று விட்டது. கட்டுநர்கள் வீடுகள் விற்பனை ஆகாமலும் வரி உயர்வினாலும் மிகவும் சிரமத்திற்கு உள்ளாகியுள்ளனர். இந்நிலையில் சிமெண்ட் முதலாளிகளின் கூட்டு கொள்ளை விலையேற்றம் செய்து தொழிலை மேலும் முடக்குகிறார்கள். மணல் தட்டுப்பாடு தொடர்ந்து நீடிக்கிறது. தமிழகத்தின் பத்திரப்பதிவு வருமானம் பாதியளவுக்கு கூட வரவில்லை என அறிக்கைகள் கூறுகின்றன. அரசு ஒப்பந்ததாரர்களுக்கு செய்த பணிகளுக்கு பணம் பட்டுவாடா மாதக் கணக்கில் தாமதமாகிறது.

கச்சா எண்ணெய் விலை குறைவால் இதுவரை இல்லாத அளவிற்கு பெட்ரோல் டீசல் விலை குறைந்துள்ளது. நாட்டில் மழை நன்கு பெய்துள்ளது. விளைச்சல் நல்லபடியாக நடந்து அரிசி, காய்கறி, தானியங்கள் விலை குறைந்துள்ளது.

நல்லவைகளும் அல்லவைகளும் கலந்து கடந்த வருடம் கழிந்துவிட்டது.

மாறுதல் என்பது மாறாதது, கடந்து வந்த அனுபவங்களிளிலிருந்து இனி வரும் காலத்தை வளமானதாக்குவோம்.

2015ம் ஆண்டு தமிழக மக்களுக்கு நல்ல ஆண்டாக அனைவருக்கும் வளம் தரும் ஆண்டாக அமைய நம்பிக்கையுடன் , தன்னம்பிக்கையுடன் வரவேற்போம்.

உள்ளுவது எல்லாம் உயர்வுஉள்ளள் மற்றுஅது
தள்ளினும் தள்ளாமை நீர்த்து - திருக்குறள்

அன்புடன்
மு. மோகன்

மய்யத் தலைவர் மடல்

R. சிவக்குமார்

தென்னக மய்யத்தின் 2015-16ம் ஆண்டுக்கான நிர்வாகிகள் மற்றும் செயற்குழு பொதுக்குழு உறுப்பினர்களின் தேர்தல் நடந்து முடிந்தது.

அகில இந்திய அளவில் மிகப் பெரிய மய்யத்தின் தேர்தலில் ஒருமனதாக நிர்வாகிகள் தேர்ந்தெடுக்கப்பட்ட விதம் மய்யத்தின் தலைவர் என்கிற வகையில் எனக்கு பெருமையளிக்கிறது.

2015-16ம் ஆண்டின் மய்யத்தலைவராக - தலைவராக - திரு. O.K. செல்வராஜ் அவர்கள், துணைத்தலைவராக - திரு. C. சதீஷ் குமார் அவர்கள், செயலாளராக - திரு. K. வெங்கடேசன் அவர்கள், பொருளாளராக - திரு. K. அண்ணாமலை அவர்கள், இணைச் செயலாளராக - திரு. S. இராமப்பிரபு அவர்கள்.

மற்றும் 15 செயற்குழு உறுப்பினர்கள் 42 பொதுக்குழு உறுப்பினர்கள் ஏகமனதாக தேர்ந்தெடுக்கப்பட்டனர்.

12.12.2012 அன்று மாநிலஅளவிலான மய்யத்தலைவர்கள் கூட்டம் மாநிலத்தலைவர் தலைமையில் தென்னக மய்யம் சார்பாக நடத்தப்பட்டது. இதில் சிமெண்ட் விலை உயர்வு குறித்தும் மேற்கொள்ள வேண்டிய நடவடிக்கை குறித்தும் விவாதிக்கப்பட்டது.

13.12.2014 அன்று தென்னக மய்யம் சார்பாக கட்டுநர் தின விழா மற்றும் குடும்ப விழா நிகழ்ச்சி VGP Aqua Kingdom Water Park சென்னையில் கடற்கரையோரம் மிகவும் சிறப்பாக நடைபெற்றது.

தென்னக மய்யத்தின் ஒற்றுமையும் வலிமையும் என்றும் நிலைக்க உங்கள் ஆதரவு தொடர்ந்து நல்கக் கேட்டுக் கொள்கிறேன்.

அன்புடன்

R. சிவக்குமார்
மய்யத்தலைவர்

Need Of Non-Destructive Testing

M. Karthikeyan
Consultant (Rehabilitation) Past President - BAI

Worldwide, the concrete structures of Buildings, Bridges and all infrastructures get deteriorated in a rapid manner after 20, 30 years of construction. It may be due to external factors like over loads, change in usages or environmental factors, earthquake, fire etc. or it may be due to chemical exposures inside the structure in non-adequate structural strength etc. Those structures cannot be replaced with new one due to non-availability of space, money and time constraints. The alternatives are to improve the strength characteristics of the structure to extend the service life like what we do health monitoring for human being.

It is necessary to test concrete structures whether the structure is suitable for its designed or expected use to expected life. To determine the condition of structures tests required should be done without damaging the concrete. The range of tests include the completely non destructive tests, partially destructive tests where the concrete structure is damaged partially, like concrete Strength and pull out and pull off tests, where surface has to be repaired after tests. The range of properties that can be assured using nondestructive tests and partially destructive tests is quite large and includes fundamental parameters as density, elastic modulus and strength as well as surface hardness and surface absorption and reinforcement location, size and distance from outer surface. Exploring the Quality of workmanship and structural integrity with void's present, cracking and delimination may be possible.

Non-destructive tests (NDT) are applied to both old and new structures. For quality of concrete and to assess the quality of materials and construction, when in doubt the NDT can be done, and to find out the structural integrity and adequacy. In all such cases, the NDT can be used for instance, by removing cores for compression testing and such preliminary tests.

NDT May be useful to assess.

- Quality control of concrete
- Removing uncertainities about the acceptability of the materials supplied owing to apparent non-compliances with specification.
- Confirming or negating doubt concerning the workmanship involved in batching, mixing, placing, compacting or curing of concrete.
- Monitoring of strength development in relation to formwork removal, cessation of curing, presenting, load application or similar purpose.
- Location and determination of the extent of cracks, voids, honeycombing and similar defects within a concrete structure.
- Determining the concrete uniformity, possibly preliminary to core cutting, load testing or other more expensive or disruptive lasts.
- Determing the position or condition of reinforcement.
- Increasing the confidence level of a smaller number of destructive tests.
- Determing the extent of concrete variability in order to help in the selection of sample locations representative of the quality to be assessed.
- Confirming or locating suspected deterioration of concrete resulting from such factors as overloading, fatigue, external or internal chemical attach or change, fire, explosion environmental effects.
- Assessing the potential durability of the concrete.
- Monitoring long-term changes in concrete property.
- Providing information for any proposed change of use of a structure for insurance or for change of owner ship.

NDT – Methods.

The following are the typical methods of NDT methods.

- Visual inspection – Experienced Engineers will be able to establish the possible causes to damage to concrete in the structure and identify the NDT methods needed to investigate of the problem.
- Half call electrical potential method-to detect the level of corrosion in reinforcement taken place.
- Schmidst/rebound hammer test to evaluate the surface hardness of concrete
- Carbonation depth measurement test – to find out the moisture reaching the reinforcement to induce corrosion.
- Permeability test – to measure the flow of water through the concrete.
- Penetration resistance or Windsor probe test- to measure the surface hardness and the strength of the surface layer.
- Cover meter – to measure the distance of steel reinforcing bars from the surface of the concrete and possible diameter the bars.
- Radiographic testing to deduct voids in the concrete and position of stressing duets.
- Ultrasonic pulse velocity testing – to measure the integrity of concrete and compressive strength.
- Sonic methods using instrumented hammer providing both sonic echo and transmission methods.
- Tomography modeling using data from ultrasonic transmission in two or more directions to dedcef voids in construction.
- Impact echo testing, used to deduct voids, determination and other anomalies in concrete.
- Ground penetrating rude or impulse radar testing to deduct the position of reinforcing bars or stressing duets.
- Infrared thermograph – to deduct voids determination and other anomalies in concrete and also water entry points in buildings.
- (Next Article on the subject 'Visual Inspection' will follow in Southern Builder- Readers are free to contact the author through mobile 98403 39446 0r email emkar9999@gmail.com)

அன்பார்ந்த உறுப்பினர்களுக்கு

நமது மய்யத்தின் வலிமை பெருகவும் நாம் ஒன்றுபட்டு உறுப்பினர்களின் இடர்பாடுகள் நீங்கிடவும் இந்த வருடமும் உங்களின் நல்லாதரவு தொடர்ந்து கிடைக்க வேண்டும் என்று கேட்டுக்கொள்கிறேன். மேலும் மய்யத்திற்கு வருடாந்திர புதிய உறுப்பினர்களையும், நிரந்தர உறுப்பினர்களையும் அதிக அளவில் சேர்க்க உதவுமாறு கேட்டுக் கொள்கிறேன்.

உங்கள் ஆதரவினால்தான் அகில இந்திய அளவில் உறுப்பினர்கள் எண்ணிக்கையில் அதிகம் பெற்ற மய்யம் என்ற பெருமைக்கான விருதை தொடர்ந்து பெற்று வருகிறோம் என்பதை மிக்க மகிழ்ச்சியுடன் தெரிவித்துக்கொள்கிறோம்.

கட்டுநர் சங்க உறுப்பினர்களுக்கு, கட்டுமானத் தொழில் சார்ந்த நவீன விபரங்களும் தொழில்நுட்ப தகவல்களும் தெரிந்து கொள்ளவும் தங்களது இடர்பாடுகளை களையவும் உதவ கட்டுநர் சங்கம் சேவைபுரிகிறது. சந்தாத்தொகையை பணமாகவோ அல்லது காசோலையாகவோ "பில்டர்ஸ் அசோசியேஷன் ஆப் இந்தியா" என்ற பெயரில் நேரடியாகவோ தபால் மூலமாகவோ அனுப்பி வைக்குமாறு கேட்டுக்கொள்கிறேன்.

2014-15 ஆம் ஆண்டிற்கான உறுப்பினர்கள் சந்தா விபரம்

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K. வெங்கடேசன்
பொருளாளர்

Glass Fibre Reinforced Concrete

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Structural Engineer, Dean Civil Engineering,
Meenakshi Sundararajan Engineering College Former Principal
P.T.Lee.Chengalvaraya Naicker Polytechnic College

Glass fiber reinforced concrete, also known as GFRC or GRC, is a type of fiber reinforced concrete. Glass fiber concretes are mainly used in exterior building façade panels and as architectural precast concrete. Somewhat similar materials are fiber cement siding and cement boards. GFRC is an engineered concrete that has numerous applications in concrete products including ornamental structures, fountains, domes, and planters. GFRC is also used extensively for decorative panels. Glass fiber reinforced concrete is basically concrete material that utilizes glass fibers for the reinforcement, as a substitute of steel. The glass fibers are normally resistant to alkali. Alkali resistant glass fiber is used extensively since it has a greater resistant to the environmental effects. GFRC is a combination of cement, glass fibers, and polymers. It is normally cast in thin sections. As the fibers are not rusted like steel, protecting concrete coat is not necessary for the prevention of rust. The weight of thin and hollow products produced by GFRC is considerably lesser than the conventional pre-cast concrete. The material characteristics will be influenced by the concrete reinforcement spacing, and the concrete reinforcement mesh.

Glass Fibers Properties : Straight- Diameter ranges from 0.005 to 0.015mm (may be bonded together to form elements with diameters of 0.13 to 1.3mm)

Composition of Glass Fiber Reinforced Concrete (GFRC)

Glass fiber reinforced concrete composites contain

A Decorative GFRC Application

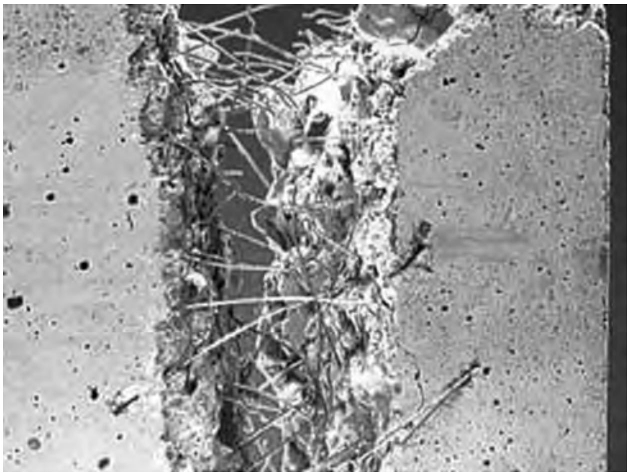
high strength glass fibers that are surrounded by a cementitious medium. In this shape, both the fibers and the environment maintain their natural individual chemical characteristics. However, the concrete produced has improved resultant properties that cannot be attained if either of the components is used individually. The glass fibers are the main elements that carry the load, while the enclosed matrix keeps the fibers in the preferred position and direction. The medium facilitates transfer of the load on the fibers, and shields them from the damage due to environment. Glass fibers can be integrated into the matrix either in constant or irregular lengths. The most widespread shape in which glass fiber reinforced composites are used in structural applications is known as laminate. This form is achieved by consolidating fine fiber layers and a matrix into the desired size. The orientation of fiber in each layer, and the stacking sequence of the layers, can be used to produce a range of mechanical properties of the composite materials.

All these properties are combined with the fact that GFRC looks like solid concrete, although it weighs only one-third of the original solid concrete weight. This makes it ideal for outdoor or indoor applications where lightweight and durable concrete is needed. Such applications may include decorative structures, fountains, domes, planters, etc.

Structural Characteristics of GFRC

Strength of GFRC is developed due to high contents of alkali resistant glass fibers and acrylic polymer. Since the cement contents are high, and the ratio of water to cement is low, the GFRC strength under compressive loads is high. These materials also possess great tensile and flexural strength. The fiber orientation determines the effectiveness of fiber resistance to loads. The fiber must be stiff to ensure the provision of required tensile strength. Thus, the performance of these materials is better than the normal concrete. The high fiber content bears the tensile loads, while the concrete is flexible due to the polymers. The physical properties of GFRC are better than the non-reinforced concrete. Steel reinforcement that has been suitably designed considerably increases the strength of products that are cast with normal concrete or GFRC.

However, GFRC cannot substitute reinforced concrete if heavy loads are required to be endured. GFRC are best suitable for light loads. Applications of GFRC are vanity tops, wall panels, and other comparable products. The fiber orientation determines the effectiveness of fiber resistance to loads. The fiber must be stiff to ensure the provision of required tensile strength.



Advantages of Glass Fiber Reinforced Concrete

GFRC is an engineered material. Its properties can change depending upon the design of mix, fiber content, and the techniques used for manufacture. The use of GFRC has become popular due to its numerous favorable properties:

GFRC has been tested in the laboratory and also in the actual installations, and can be anticipated to survive as long as pre-cast concrete. In numerous environmental conditions, like when exposed to salts or moisture, GFRC is likely to function better due to the absence of steel reinforcement that may corrode.

Relatively light in weight compared to the traditional stones. Its installation is fast and comparatively simple.

GFRC has the characteristics to be cast into almost any shape.

GFRC consists of materials that are unlikely to burn. The concrete takes the role of a thermal regulator while exposed to fire and protects the materials from the flame heat.

GFRC is thin and strong, with weight being 75% to 90% less compared to solid concrete. Less weight facilitates easy and rapid installation, and also decreases the load applied on the structure. The light weight and tough material also minimizes the transportation expenditures, permits flexibility in design, and reduces the impact on environment.

Superior strength enhances the ability to endure seismic loads.

GFRC is less vulnerable to weather effects and more resistant to freeze thaw than the normal concrete.

GFRC is prepared of minerals and will not easily burn. When exposed to a flame, the concrete functions as a thermal regulator. It protects the materials fixed with it from the flame heat.

These materials are comparatively lighter when compared to the conventional materials. Their installation is therefore fast, and normally simple. Concrete may be produced in thin sections.

GFRC may be cast to almost any shape of columns, wall panels, domes, moldings, and fireplace surrounds.

High strength can be obtained by using GFRC, being tough and resistant to cracking. It has a high ratio of strength-to-weight. Therefore, the GFRC products are durable and light. The transportation costs are reduced significantly being of less weight.

Since GFRC is internally reinforced, other types of reinforcement are not necessary that may be complicated for complicated molds.

Suitable consolidation of mix is achieved for GFRC that is sprayed, without any vibrations. Use of rollers or vibrations, to attain consolidation, is simple for GFRC that is poured.

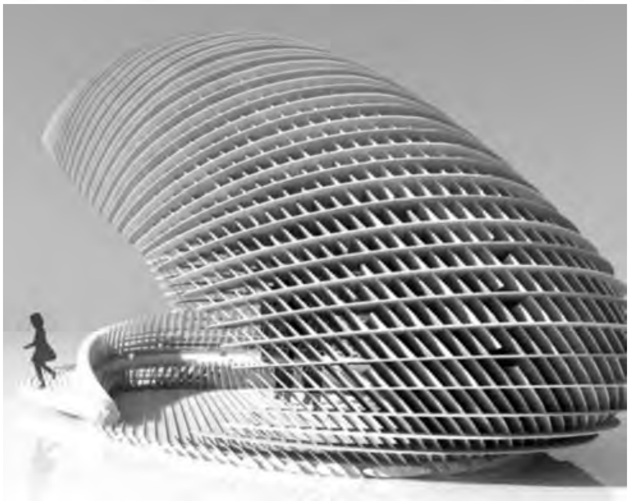
A good surface finish is obtained, without voids, since it is sprayed and such defects do not appear.

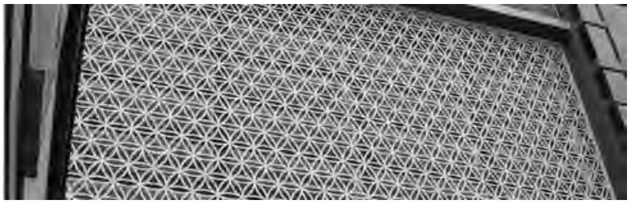
Since the materials have a fiber coating, they are unaffected by the environmental effects, corrosion attacks, and other harmful effects

Comparison of GFRC to Precast Concrete

The elasticity and density of the GFRC is greater than precast concrete. The cement to sand ratio for GFRC is approximately 1:1, while for precast concrete it is 1:6. The glass fibers included to reinforce the concrete produce considerably greater impact strength and lower permeability to water and air than precast concrete. GFRC looks like a natural stone and permits the designer greater flexibility in form, color, and texture.

Few Examples of Fiber Reinforced Concrete Structures are given below





Green Industries, and Orange Industries

S Ramaprabhu
Joint Secretary

(other than Special and Hazardous industries) up to 200 HP Permissible in Industrial use zone

Sl. No	Description	Continuous Building Area anywhere within CMA	Chennai City , Municipal & Town panchayat area excluding the areas mentioned in col.3	Rest of CMA
1	2	3	4	5
A	Minimum Plot extent	220 Sq.m	330 sq.m	440 sq.m
B	Minimum plot frontage / width	9 m	12m	12 m
C	Minimum road Width	7.2m		
D	Maximum Height	One and half times the width of the abutting road provided that the height may be exceeded to the extent of 1 metre for every 30 centimeters by which the building is set back from the street or 15.25 meters whichever is less except in areas set apart specifically for multistoried buildings.		
E	Maximum FSI	1.0	1.25	1.25* (if the road width is more than 9.0m, FSI upto 1.50 can be permitted)
F	Maximum Plot Coverage	75 %	75 %	75 %
G	Minimum Setbacks	Where Street Alignment / new road is prescribed in these regulations, it shall be from that street alignment / new road line. In the case of others, it shall be from the property boundary		
(i)	Front Set back	6m		
(ii)	Side Set back	Nil	2m on either side	
(iii)	Rear Set back	Nil	NIL	
H	a) Structure permissible in the minimum prescribed Front setback, Side setback, and Rear Setback are in the regulation No.11 b) In additions, incidental structures such as Gate Pillars, servant room, watch man booth, cycle stand and toilets with height not exceeding 4m are permissible in these minimum prescribed setback spaces			
I	Parking spaces shall be provided within the site conforming to the regulations given in the Annexure XVI			
J	Rainwater harvesting provisions as prescribed in the Annexure XIX shall be provided			

Note : (ii) In CBA, there shall be atleast 1 m wide internal passage from rear to front in Ground floor, directly accessible to road.

Industries exceeding 200 H.P. (other than the industries listed under Special and Hazardous Industries)

Sl.NO	Description	Continuous Building Area anywhere within CMA	Chennai City , Municipal & Town panchayat area excluding the areas mentioned in col.3	Rest of CMA
1	2	3	4	5
A	Minimum Plot Extent	Not applicable	2000 sq.m	1500 sq.m
B	Minimum Plot Frontage / width	Not applicable	30 m	25 m
C	Minimum road Width	Not applicable	9 m	
D	Maximum Height	Not applicable	One and half times the width of the abutting road provided that the height may be exceeded to the extent of 1 metre for every 30 centimeters by which the building is set back from the street or 15.25 meters whichever is less except in areas set apart specifically for multistoried buildings	
E	Maximum FSI	Not applicable	1.25	1.25
F	Maximum Plot coverage	Not applicable	75 %	75 %
G	Minimum Set backs	Not applicable	Where Street Alignment / new road is prescribed in these regulations, it shall be from the street alignment / new road line. In the case of others, it shall be from the property boundary.	
(i)	Front Set back		8 m	
(ii)	Side set back		3.5 m on either side	
(iii)	Rear set back		3.5 m	
H	a) Structures permissible in the minimum prescribed Front set back, Side setback and Rear set back are given in the regulations No.11 b) In addition, incidental structures such as Gate pillars, servant room, watch man booth, cycle and two wheeler stand and toilets with height not exceeding 4 m are permissible in these minimum prescribed setback spaces. Provided total length of such incidental structures in the setback spaces shall not exceed 50 % in length of the longer side			
I	Parking spaces shall be provided within the site conforming to the regulations given in the Annexure XVI			
J	Rainwater harvesting provisions are prescribed in the Annexure XIX shall be provided.			

Courtesy : CMDA

to be continued...............

Taxation of Works Contracts Under

TN VAT Vs Profit Maximization in Project Execution

S.D Kannan
Chairman, Taxation Committee

I. TNVAT:- A new notices being issued by TNVAT – Enforcement wing in Coimbatore, to the purchasers of flats who pay for construction cost of the flat. As per the notice the individual buyer has to deduct VAT @ 2% for the value of construction cost, under works contract paid to the Builder / Promoter u/s 13 of the TNVAT Act and remit to the department and also issue TDS Certificate to the builder. This is a very bad attitude of the department which will adversely affect our builders.

Section 13. Deduction of tax at source in works contract.

Notwithstanding anything contained in this Act every person responsible for paying any sum to any dealer for execution of works contract shall, at the time of payment of such sum, deduct an amount calculated, at the following rate, namely:-

(1) Civil works contract two per cent of the total amount payable to such dealer;

(2) Civil maintenance works two per cent of the total amount payable to such dealer;

(3) All other works contracts [five per cent]' of the total amount payable to such dealers;

Explanation:- For the purpose of the section

(a) the term 'person' shall include

(i) the Central or a State Government;
(ii) a local authority;
(iii) a corporation or body established by or under the Companies Act, 1956 or State Act;
(iv) a company incorporated under the Companies Act, 1956 (Central Act 1 of 1956) including a Central or State Government undertaking;
(v) a society including a Co-operative Society;
(vi) an educational institution; or
(vii) a trust;

(b) the term "Civil Works Contract" shall have the same meaning as in the Explanation to section 6.

The intention of the law maker is not to include Individuals but the officials are interpreting the explanation and issuing notices. From the discussions we had with the senior consultants, we came to know that the issue has been brought to the notice of the Commissioner VAT it is under consideration. Mean while it is also suggested to represent this issue to the commissioner from our side.

II. STAMP DUTY:- Service Tax also to be included for Registering the Construction Agreement: "Dinamalar" 11.12.2014.

A News item appeared in Dinamalr on 11.12.2014, which says in Saidapet Sub-Registrar office there is a poster exhibited as "¸ðÊ¼ ´ôÀó¾ ¬Å½ò¾¢ø ¦Á¡ò¾ Á¾¢ôÀ¢ø 4% §º¨Å Å¡¢ (Service Tax) ¦ºÖò¾ §Åñ Îõ".

It is totally confusing to the all readers. We need not pay service tax to the Sub-Registrar. Service Tax has to the paid on-line only to Service Tax Office.

Here we must note that 1% Stamp Duty and 1% Registration fee on Construction Agreement to the paid including Service Tax collected.

Illustration:-

VIZ Construction Value 50,00,000

Add Service Tax @ 4.944% 2,47,200

(or 3.09% including Land value) 52,47,200

Stamp Duty and Registration fee @ 2% total paid to Registration the Construction Agreement Rs.1,04,944

Please Note

III. EC - Fees:- They revised the fee for EC two times.

Meaning of Works Contract in TN VAT : Sec 2(43) defines as "Works Contract" includes any agreement for carrying out for cash, deferred payment or other valuable consideration, building construction, manufacture, processing, fabrication, erection, installation, fitting out, improvement, modification, repair or commissioning of any movable or immovable property.

It need to be very careful while reading these lines that the act has not given the exact and exclusive definition but the definition specifically includes the activities/ nature of transactions covered under the Works Contract. In the absence of the exclusive definition for the words/ phrase "Works Contract" one need to refer the definition of works contract under the General Clauses Act and relevant judicial pronouncements from time to time.

Taxation under TN VAT The works contract is been governed by two different methods and the option is left to the choice of the dealer.

First Method: This method is also known as Method of Composition or Composite method of tax payment. In this case the dealer is liable to pay tax on the total value of the works contract at the applicable rates. The applicable rates are 2% for civil works and civil maintenance works and 5% *(4% till the amendment on 13/2/2012)* for all other works. And the highlighting points under this method are (a). The dealer has to present his option of payment of tax under this method with the assessing authority before 20th of May of the financial year or along with the first month return after commencement of the works contract execution, as the case may be, (b) The dealer is not required to maintain books of accounts under this act., and it does not mean that he/ she need not maintain books of accounts under the other law(s) in the land, and (c) The dealer cannot take Input Tax Credit on the purchases or on the inputs, and more importantly (d) the tax has to be paid out of his margin earned or to be precise he has no rights to collect the tax portion from his customer(s). The reader may mark these facts/ points are covered under sec. 6 of the TN VAT Act.

Second Method: It is opposite to the first method and it is known as Non-composition in general and the properties are:

(a) the dealer is not liable to pay tax on the total value of the works contract/ total turnover at the applicable rates but on the taxable turnover only and again the percentage of tax payable on the said turnover is based on the form of the property and its applicable rate as listed in the different parts of the First Schedule of the Act.

(b) Unlike the other method the dealer need not place his/her option of payment of tax liability under Non-composition. Once the dealer fails to present the option, it is automatic that he is liable to pay tax under Non-composition method.

(c) The dealer is required to maintain books of accounts under this act and to produce the evidence(s) with the appropriative authorities, as and when required by them.

(d) The dealer is entitled for Input Tax Credit on the purchases or on the inputs, subject to certain restrictions, as prevalent from time to time.

(e) The dealer cannot take Input tax credit on the purchases under CST act.

The reader may mark these facts/ points are covered under sec. 5 of the TN VAT Act.

Common for both the cases/ Methods: The option opted as above is final and binding and the dealer has no option to switch over to other method with in the financial year. However switching from one method to another is possible from the next financial year, even if the project is continued to be in execution and this switch over is subject to the fact that the dealer may have to forgo if the dealer who want to switch over from Non-composite method to Composite method and not vise versa.

Difference between (i) Value of the Works Contract under the first method and (ii) Taxable Turnover under the second Method:

The total consideration received or receivable in future in respect of the works contract agreement, accounted under the regular accounting practice of the dealer whether on Mercantile or an accrual basis. To say the value received plus receivable plus escalation if any due in future is called **Value of Works Contract.**

The ***Taxable Turnover*** means, the value of the works contract adjusted by the component of exempted goods and services included or inbuilt in execution of the works contract. To cover an example(s) is/are: labour charges paid on execution of the civil works, equipments or apparatus covered under Part-B of Fourth Schedule (Sec. 15). It is to be noted that the value of VAT charged in the Invoice is not part of the value of the works contract, for the purpose of taxable turnover.

Assessment of Tax Liability on Taxable Turnover: The dealer is liable to pay tax at the rates specified in the First Schedule on the taxable turnover. If the inputs/ purchases for execution of the projects are covered by more than one tariff category/ group of goods and services fall under more than one rate of tax, then the taxable turnover is divided in to more than one group in the same ratio of the inputs category/ group. Now the splited taxable turnover be charges on the respective tax rates as per the first schedule to arrive the tax payable.

Illustration: Dealer Company 'A' has accepted an assignment of Design, Development, Commissioning of sewerage water treatment plant from Govt. department 'B' for a consideration of **Rs.100** lakhs plus applicable VAT. In this case the contractor company 'A' has spent labour expenses in construction a sum of **Rs.32.00** lakhs, Design charges a sum of **Rs.1.50 lakhs**, Purchase of Pumps from the dealer situated in other state a sum of Rs.**10.00** lakhs, Purchase of Pumps and motors from the dealer situated within the state a sum of **Rs8.50** lakhs, Purchase of cements from the dealer situated within the state a sum of **Rs.8.50** lakhs, Purchase of bricks, blue metals etc from the dealer situated within the state a sum of **Rs.8.50** lakhs and Purchase of Electrical goods from a dealer situated outside the state a sum of **Rs.7.00** lakhs and dealer situated with in the state a sum of **Rs.15.00** lakhs. Based on this stimulated data's lets assess the tax liability of the dealer to the VAT authorities.

(1) If the dealer wishes to pay tax on composition/ first method, the tax payable is 5% on the total contract value of ₹ 100.00 lakhs. (i.e 5 .00 lakhs) PLUS applicable purchase tax on all the interstate purchases, to the extent of the opportunity revenue loss to the state government, since the dealers are not permitted to buy the goods from a dealer who located outside the state of Tamil Nadu, as he/she has opted composite method.

(2) If the dealer wishes to pay tax on Non-composition/ second method, the process of assessment of tax liability is illustrated bellow:

A	**Value of works contract**	**100.00**lakhs			
B	Input services considered for execution of contract				
	Labour and Design charges	**33.50**lakhs			
C	Input goods covered under Part B of first Schedule (inputs covered under 5% TN VAT)	Value Rs. In Lakhs			
		Gross	Basic	VAT	CST
	Purchase of pumps (CST)	10.00	9.80		0.20
	Purchase of pumps and motors	8.50	8.10	0.40	
	Purchase of bricks, blue metals etc	8.50	8.10	0.40	
	Purchase of electricals (CST)	7.00	6.86		0.14
	Purchase of electricals	15.00	14.29	0.71	
	Sub total:	49.00	47.15	1.52	0.33
	Value of good covered under Part B of first schedule	**47.48**			
D	Input goods covered under Part C of first Schedule (inputs covered under 14.5% TN VAT)	Value Rs. In Lakhs			
		Gross	Basic	VAT	CST
	Purchase of Cements	8.50	7.42	1.08	
	sub total:	8.50	7.42	1.08	
	Value of good covered under Part B of first schedule	**7.42**			

Cost of execution of the project = **33.50 + 47.48 + 7.42 = 88.40 lakhs**

Ratio among the exempted and taxable goods would be **33.50 : 47.48 : 7.42**

Accordingly the exempted turnover and the taxable turnover would be assessed as under:

Turnover Exempted under Rule 8(5)(d) (30%)	30.000Lakhs	
Turnover Taxable @ 5% = (70*47.48)/(47.48+7.42)	60.535Lakhs	
Turnover Taxable @ 14.5% = (70*7.42)/(47.48+7.42)	9.465Lakhs	
Total Turnover	**100.000**Lakhs	
Assessment of tax to be collected	Basic	VAT
Turnover Taxable @ 5%	60.535	3.027Lakhs
Turnover Taxable @ 14.5%	9.465	1.372Lakhs
Total value of TN VAT to be collected from the customer		**4.399Lakhs**
Assessment of Tax to be paid to VAT authorities		
Total of VAT collected from the customer		4.399Lakhs
Less: input credit eligible		2.600Lakhs
Balance of Payment to be made to VAT authorities		**1.799Lakhs**

Considering the relevant provisions in the act and in the agreement the maximum billing could be possible under composite method is ₹ 100.00 lakhs and under non-composite method is ₹ 103.903, in the given hypothesis. The table given bellow is the illustrative comparisons on the changes in profit element owing to the option excised by the dealer, in the given hypothesis:

Comparisons of results with key factor of tax liability	**Rs in Lakhs** U/s 5	U/s 6	***Notes to the hypothesis considered:***
Total turnover	100.000	100.000	
Add: Tax collected from the customer	4.399	0.000	(i) being the nature
Total receipts	104.399	100.000	of works falls under
Less : Payments made to vendors/ others	91.00	91.000	electro mechanical
Less : Payments made/ to be made to VAT authorities	1.799	5.000	works, the dealer will get the
Less: Purchase tax paid/ to be paid to VAT authorities	0.000	0.850	deduction under rule 8(5)(d) is 30%
Profit/ Margin element	**11.600**	**3.150**	(ii) TDS under VAT act a sum of ₹ 5.00

lakhs to be made by the customer to be adjusted against the dues to the dept, has not been considered in the illustration exhibited above, as the issue been dealt in a separate article as "TDS under TN VAT Rules (revised)" (iii) if the agreement/ works order specifically says that the rates quoted is inclusive of VAT, then the entire workings need to be done separately and the author may be reached for professional supports in this regard.

Additional facts:

If the dealers opt to pay tax on the first method/ composition method of tax liability, he can not apply for Form S with the authorities, the tax liability and the VAT TDS are one and the same. In the absence of Form S, the employer contractor (customer) is bound to deduct 5% on the works contract value. In case if the dealer wishes to avoid this, he has the option to pay the VAT taxes billed in the invoice in advance to the assessing authorities and obtain the Form S and avoid the TDS process.

Interpretation(s):

The VAT Rules provides the fact that if the sub-contractor is registered dealer filing the returns under VAT Act., the main contractor turnover to the extent of the payment made to the subcontractor is exempted from works contract value/ taxable turnover. The VAT Act or Rules has not given effect of exemption in the hands of sub-contractor, even if the main contractor has opted to pay tax under non- composition method (under sec 5 of the act.), and in addition to this the Rule 8(5)(d) provides to assess the exemption from the taxable turnover in the absence of data's in the books of accounts, but the rule has failed to restrict the allowance subject to the maximum amount as calculated under this rule or actual amount spent, whichever is lower, so as to tax the profit element behind the project.

The readers are informed to note that the facts and information's stated in this article is only the opinion of the author and assesses can use the concepts and logical used in this article in support of their cases.

By – Jagadeswaran.P
(eswaran60@yahoo.com)

November Issue - SUDOKU - புதிருக்கான விடை

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2	3	8	1	5	6	9	7	4
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December Issue - SUDOKU - புதிர்

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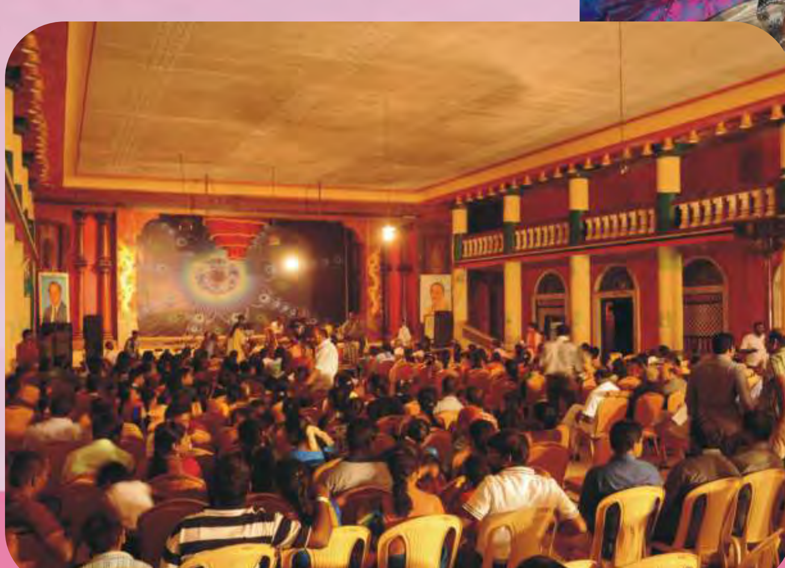
ELECTION 2015-16

BUILDERS DAY - FAMILY MEET



BUILDERS DAY - FAMILY MEET

On behalf of Sand Lorry Owners Association One day hunger strike was organized at Chennai to highlight the difficulties of bringing sand from faraway places. All India Past President Mr. R. Radhakrishnan addressing the gathering after completing the hunger strike

Personal Protective Equipment (PPE) Awareness Programme Hariharan Foundation Work site at Oragadam

Opening of Buildrock 2014 Exhibition on 24th December 2014 at corporation ground, Trichy 17 Persons from L to R: R. Saravanan, Project Chairman Sri S. Senthil Kumaran, Chief Guest (cutting the ribbon) Srl V. Jayaraman, centre Chairman Sri N. Sivakumar, Secretary Sri R. Murugesan and Sri Rajasekaran.

Validictory function of Buildrock 2014 on stage Persons from L to R: Sri MVG Jawagar, centre Chairman Sri N. Sivakumar, Project Chairman Sri S. Senthil Kumaran, Guest of honour Sri G. Tennarasu, Chief guest Sri VP. Dandapani commissioner of Trichy Corporation and Secretary Sri R. Murugesan.

Passive Income

Er. S. Nethaji

What is Passive Income?

We all have income but we haven't much bothered about what kind of income it is. Unfortunately our 14-years' of schooling and a few years of college education has not taught us anything about the types of income. The sad part is even Finance Graduates seem to lack the knowledge of Passive Income and how it can be a savior in our life.

Wikipedia defines Passive Income as "An income received on a regular basis, with little effort required to maintain it."

Some popular sources of Passive income are

- Rental Income from Properties
- Interest from Bank accounts
- Dividend from a Stock Investments
- Royalties from a Book or from licensing a Patent
- Income from a business that doesn't require the owners involvement
- Fees from Franchising your Business model
- And so on

In reality you can do many other things if you understand the concept.

Why Passive Income is Important?

We are all actively working and earning a salary or a commission or through our own business/ consultation. We are making this income by trading our time and effort. When we reach a stage when we are not able to give time and effort, our income will stop flowing in. This could happen when we retire or when we meet with an accident or a disease that leaves us incapable of working.

At that time we become dependent on someone else – our parents, spouse, children, friends, or relatives. That could be the worst thing that could happen to us.

Think about it…

Would you not like to be independent, at least financially, till you die?

Would you not like to live a lifestyle and spend they way you prefer with your money?

Would not not like to leave behind a legacy/ Passive Income to your children so that they praise you for ever?

If you answer YES to the above questions, you better create Passive Income streams for yourself and your family.

If all this doesn't excite you, please read on for the most interesting thing that can happen to you when you create Passive Income.

How about retiring early?

We all have dreams of travelling to different countries, persuing our hobbies/ Passions that we postpone or compromise for want to time.

Imagine if you can take a break from work/ business for a few months or even a few years, not having to worry about earning for your family. Or further still NEVER have to work again for the rest of your life for want of money. How do you like it?

Honestly, we all feel our current job sucks sometimes and we want a break or an opportunity to try something different. Don't we?

You can choose to work on things that excite you or in areas where you are passionate about or even render service to people, if you have a large enough Passive Income that can take care of your and your family needs.

Isnt this exciting enough to put you mind to generating some Passive Income streams?

Lets work on creating Multiple Streams of Passive Income.

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¾¢Õ. ã. ¬. «ôÀ ý

Ý¡¢Â ¦ÅôÀò¾¢ø ´Õ Å¢ò¨¾ (§Å÷Ì¸¼¨Ä, ¦¿ø §À¡ýÈ¨Å) ±ùÅÇ× §¿Ãõ, ±ùÅÇ× ¿¡ð¸û ¸¡Â¨Åò¾¡Öõ, «ùÅ¢¨¾Â¢Ù ûÇ Ó¨ÇÌ Ìõ ¾ÈÉ ý Å¡¢ÂÁ¨¼óÐ ±ùÅÇ× ¿¡ð¸û þÕôÒ ¨Åò¾¡Öõ, Ó¨ÇÌ Ìõ ¾ÈÉ ý ¦¸¼¡Ð Ó¨ÇÅÕ¸¢ýÈÐ. ¯Â¢÷ þÕÌ¸¢ýÈÐ. ¾¢ ¦ÅôÀò¾¢ø «ùÅ¢¨¾ º¢È¢Ð §¿Ãõ ¨Åò¾ À¢ÈÌ «ùÅ¢¨¾ Ó¨ÇÌ¸ ¨Åò¾¡ø «ùÅ¢¨¾Â¢Ä¢ÕóÐ Ó¨Ç ÅÕÅ¾ø ¨Ä. ¯Â¢÷ þø ¨Ä. þÈó¾ ¯½ Å¡¸¢ýÈÐ. ±É§Å ±ô¦À¡ØÐõ ¾Â¢ø ¦Åó¾ þÈó¾ ¯½ ×¸ ¨Ç§Â ¿¡Óõ ¯ ñ À¾¡ø¾¡ý ¿Áì Ì §¿¡ö¸û ¯ ñ ¼¡¸¢, ¿¡õ ¿¨¼À¢½Á¡¸¢, º¡¨ Å §¿¡Ì¸¢ Å¢¨ÃóÐ ¦ºø¸¢ý §È¡õ. ±É§Å, ¿¡õ ¦ÁøÄ, ¦ÁøÄ þÂü¨¸Â¡¸, ì¸¢¨¼Â¢Ì¸¢ ÜÊÂ ¯Â¢ÕûÇ þÂü¨¸ ¯½× ¸¨Ç ¯ ñ ½ôÀÆ¸¢É¡ø, ¿ÁÐ ¯¼ÄÄ¢ÕóÐ ¦ÁøÄ §¿¡ö¸û ¿¢í¸¢, ¬§Ã¡ì¸¢ÂÓõ, ¬üÈÖõ ¿ÁÌ Ì¸¢ðÊ, ¬Ôû ÜÊ, ¦ÀÕÅ¡ú× Å¡ÆÄ¡õ ±É þÂü¨¸ Å¢¾¢ ÜÚ¸¢ýÈÐ.

¾¢ÕÁ¾¢. ìÈ¢ŠÊý §¿¡À¢ ±õ.Ê., ±Ûõ ¬ í¸¢Ä ÁÕòÐÅ÷ ¾É Ì¸¢Õó¾ Á¡÷À¸ôÒüÚ§¿¡¨Â þÂü¨¸ ¯½× ãÄõ Ì½Á¡Ì¸¢, ¦¼Á¡÷Ì¸¢ø ÌõÇ¢¸¡÷¼ý ¾Å¢ø ÀÆ ¯½× ÁÕòÐÅÁÁ¨ É §¾¡üÚÅ¢òÐ « ¨ ÉòÐ §¿¡ö¸¨ÇÔõ ÀÆ í¸Ç¡Ä¡É ¯½× ã Ä§Á Ì ½ôÀÎò¾¢Ì¸¡ðÊÉ¡÷. ¾¢Õ.«÷É¡ø Î ² ‹ Ãð «¦Á¡¢Ì¸¡Å¢ø þÎº¡¾ ¨É ¨Âî ¦ºö¾¡÷. ®Ã¡É¢ø ¾¢Õ. §† ¡Å¡§Éº¢Âý þÃ¸º¢Âò¨¾ þÃ¾¢ Âý Á¸¢¨Á ¨Â ¦ÅÇ¢ôÀÎò¾¢É¡÷.

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2. «¾ýÀ¢ý ÁÄõ, ƒÄõ ¸Æ¢òÐ, ¬ ø, §Åø §À¡ýÈ þÂü¨¸Â¡É Àø Ì º¢ «øÄÐ §ÅõÒ; ÐÇº¢; ¸¡ºÄ¡í¸ ýÉ¢ §À¡ýÈ ²§¾Ûõ ´Õ Å ¨¸Â¡É þ ¨Ä¸ ¨Ç Å¡Â¢ø ¦ÁýÚ þîº¡Ú ãÄõ ÀøÐÄì Ì Ì¾ø ¿øÄÐ. «ùÅ¢¾õ Àø ÐÄì Ì Ìõ§À¡Ð §Áø¾¡¨¼, ¦¾¡ñ¨¼ ¬¸¢Â ÀÌ ¾¢¸¨Ç ¸¼¨Ä ¯ôÒ ¸ÄóÐ ¿£ÃÀ¢ ÁüÈ Àø ®Ú¸û ÓØÅ¨¾Ôõ ¿ýÌ Í ò¾õ þÕ ÅÐ §À¡ø «ØòÐ¾¡Ö¸ «Øò¾¢ ®Ú¸¨Ç¡ ¸ ÍòÐ¢ ÅÀÆÐ Â¢ÕôÀ¾¡ø ¾ñ¨ÉÒ¢Â¡¢ ¸ ¿¢¸ÌÐ ¾¢É¡ûÇ ¨¡¸¢ýÈÐ. ¬Ü¦À¡É¨ Âò ¾¢ÉÓõ ¾¢Õ¸¡ÄÌÓ ´Õ ¿¢ÄÐ ¿ ¢ÊÄÛ ... ¯ ÚôÀ¨ÇÄôÀÌ ¸ ¿¢ÅÐ. ¸ÖÅ¨Å ¿¢Â ÅÐÃ¢ý ¬ Ä¡ÉÐ ºÂ¢ ÁÜ ¾ÄÐ ¸Û ¬ Ä¾¡Ö¸ þÈ¢Ò¸Å ¸Ä¸¢Ä ¾¢ÊÀ¼¢Ü ÀÅ

3. À¢ý É÷ Ì Ç¢÷ó¾ ¿¡¢ø ¿Ã¡Î¾ø ¿øÄÐ. ¿¡ÃÁ¡¼ Å¡º ¨ É §º¡ôÒ ¾Å¢÷Ì¸×õ. Å¡º ¨ É §º¡ôÀ¢ø ¯ûÇ §Å¾¢Âø ¦À¡Õð¸û ¿ýÌ §ÀÌ¸Î Ê ¦ºöÔõ; ºÕÁ §¿¡ö¸û ÅÃ ²ÐÅ¡ Ìõ. ¦À¡ÕÇ¡¾¡Ãõ Å¢¨ÃÂÁ¡¸¢ýÈÐ. ¿ÁÐ ¨ ¸ ¸Ç¡ø «øÄÐ ®Ãò ÐÏ ñ Ê¡É¡ø ¿ÁÐ ¯¼ø ÓØÅ ¨ ¾Ôõ ¿ý Ì «Øò¾¢ò §¾öòÐ Ì Ç¢ò¾¡ø §ÀÈÄ¡õ. ¸¼ ¨ÄÁ¡×, º¢ÚÀÂÚÁ¡×, º¢Â¡ Ìò¾¢ò à û Ó¾¢Ä¢Â¢É ÀÂ¡ýÀÕð¸û ¦¸ Î¾ø þø ¨Ä. ¬ É¡ø ¦À¡ÕÇ¡¾¡Ãõ Å¢ ¨ÃÅ¡Ì (Å¡¢ ¨ º ± ñ 2 Ó¾ø 3 ÓÊÂ ¸¡ ¨Ä 4 Á½¢ Ó¾ø 4.30 Á½¢ Ì Ì û ¦ºöÂÄ¡õ)
4. ¿¡¢ÊÂÀ¢ ý Ó¸ ò à û (À×¼÷), ¸ ñ ¨Á Ó¾¢Ä¢Â §Å¾¢Âø ¦À¡Õû ¸ÄóÐ ¦ºÂü ¨¸ «Æ¢Ì º¡¾É í¸û ±Ð×õ ÀÂýÀÎòÐÅ ¨ ¾ò ¾Å÷Ì¸×õ. þÂü ¨¸ «Æ§¸ º¡Äîº¢Èó¾Ð.
5. ÓÊó¾ «Ç× ¾¢Èó¾ ¦ÅÇ¢Â¢ø Ý¡¢Â ¿ÁŠ¸¡Ãõ, §À¡¸¡º É õ §À¡ýÈ ÀÂ¢üº¢¸ û ¦ºöÅ¾ø º¢ÈôÒ ¨¼ÂÐ. «øÄÐ ±Ç¢Â ¯¼üÀÂ¢üº¢¸ û ¦ºöÅ¾ø ¿Äõ.
6. Ì ¨Èó¾ Àðºõ 5 ¾¼¨ Å¸ û ¿¡Ê Íò¾õ, 5 ¾¼¨ Å¸ û À¢Ã¡½¡Â¡Áõ ¬ ¸¢Â ¬ úó¾ ã î ÍôÀÂ¢üº¢¸ û ¦ºö¾ø ¿øÄÐ.
7. ¾í ¸ÇÐ Å¢ÕôÀÁ¡É ¦¾öÅò¨¾ ÒÕÅ Áò¾¢Â¢ø ¿¢Úò¾¢ Ì ¨Èó¾ Àðºõ 5 ¿¢Á¢¼í ¸û, ¾¢Â¡Éõ ¦ºö¾ø ¿Äõ À¡Ì Ìõ.
8. ±ÖÁ¢î ¨ ºÀÆî º¡Ú, «Ú¸õÒø º¡Ú, à ÐÅ ¨Ç þ¨ÄîºÚ, ¸¡¢ºÄ¡í¸ ñ ½¢ þ ¨ÄîºÚ, ¦À¡ýÉ¡í¸ ñ ½¢ þ ¨ÄîºÚ, Å¡ÆìÌ ñ Îîºð¸Ú, ¦Åû ¨Çôâ½¢îºÚ §À¡ýÈÅü¨È ²§¾Ûõ ´Õ º¡Ú, ¦¸¡ï ºõ, ¦¸¡ï ºÁ¡¸ Å¡¢ø ° üÈ¢ ¿ý Ì ¯¼Ä¢Ô ý ¸ÄóÐ ¿¢ÈÁ¡¸ Ì Ì Ê¸ Ì §Å ñ Îõ. §ÅüÀÊ º¡È¢ø ¸ ñ ¦ÀÂ¡¸ ¯ôÒ ¸Ä Ì Ì Ü¼¡Ð. þ É¢ôÒ §¾ ¨ Å¦Â¢É¢ø ¦¾Ç¢Å¡É §¾ý ¸Ä Ì Ì Ä¡õ. þø ¨Ä§Âø À ¨ É ¦ÅøÄõ, ¸Õôô ¦ÅøÄõ §º÷ôÀÐ ÀÂÅ¡¢Ä¢ø ¨Ä. ¸ ñ ¦ÀÂ¡¸ ¦Å û ¨Çî º¢É¢ §º÷Ì ÌÜ¼¡Ð. §ÅüÛÈ¢Â ²§¾Ûõ ´Õ º¡Ú «ÕóÐ¾ø, Ì ¨Èó¾Ð ´Õ Á½¢ §¿Ãõ ²§¾Ûõ º¡ôÀ¢¼¡Áø. ´Õ Á½¢ §¿Ãõ þ ¨¼¦ÅÇ¢Ì Ì Ð ±Î×õ «Õó¾¢Á¡ø þÕÌ¸¢Ç¡¸ø ÀÂý ¸¢ð Îõ. ÌÈ¢ôÀ¡¸ «Ú¸õÒø «§¿¸ À¢½¢¸Ç¢¸ ¨ Çô §À¡Ì Ì ¸¢ÈÐ. (Å¡¢ ¨ º ± ñ 5 Ó¾ø 8 ÓÊÂ ¸¡ ¨Ä 4.30 Ó¾ø 6.00 Á½¢ Ì Ìû ¦ºöÂÄ¡õ)
9. ¸¡ ¨Ä 8.00 Ó¾ø 9.00 Á½¢ «ÇÅ¢ø §¸Ãðº¡Ú,

§¾ö í ¸¡öô À¡ø, §Å÷ì ¸¼¨ Äô À¡ø, þÇ¿¦÷
§À¡ýÈÅüÈ¢ø ²§¾Ûõ ´ ý ¨È ¦¸¡ ï ºõ, ¦¸¡ ï ºÁ¡¸
¿ý Ì ¯Á¢ú ¿¦Õ¼ý ¸ÄóÐ ¿¦¾¡ÉÁ¡öì ¸¡ ¨Ä
¯½ Å¡¸ì Ì Êì ¸Ä¡õ. ¸¡ ¨Ä ¯½ × ¾Å¢÷ò¾ø ¿Äõ;
§¾ ¨Å ¦ÂÉ¢ ¯ ñ ½ ì ÜÊÂ À¢ ¨ ºì ¸¡ö¸È¢¸û §¸Ãð,
¦Å ñ ¨¼, ¾ì ¸¡Ç¢, À¢ýŠ, À¢ð åð, Óð ¨¼§¸¡Š,
¸¡ÇÀ¢•ÇÅ÷, ¦Å ñ âº½¢, Á ï ºû âº½¢, ¦ºÇ¦ºÇ,
Ò¼ø, Í ¨Ã, ¦ÅûÇ¢¡¢ Ó¾ÄÄ¢ÂÉ §¾ ¨ ÅÂ¡É «Ç×
¿ý Ì ¸ØÅ¢ «ôÀÊ§Â¡ «øÄÐ À¡ ¨ ºì ¸¡öì¸È¢
À Í í ¸Ä ¨ Å (raw vegetables salad) ¾Â¡¡¢òÐ¾¡
¯ ñ ¼Ä¢ý, ÀÆí ¸û (Å¡ ¨Æ, Á¡, ÀÄ¡, §À¡¢Î ¨ º,
ÀôÀ¡Ç¢, ¦¸¡öÂ¡, ºô§À¡ð¼¡, ¬ôÀ¢û, ¾¢Ã¡ð ¨ º,
«ý É ¡º¢ Ó¾ÄÄ¢ÂÉ) §¾ ¨ ÅÂ¡É «Ç× ¯ ñ ½ Ä¡õ.
²§¾Ûõ ´ ýÚ, þÃ ñ Î «øÄÐ ã ýÚ Å ¨ ¸Â¡É
À Î ¨ ºì ¸¡ö¸È¢¸û, ÀÆí ¸û ¯ ñ ¼¡ø §À¡ÐÁ¡ÉÐ
«øÄÐ ¾ ñ ½£¡¢ø ° È ¨ Åò¾ Ó ¨ Çì ¸ðÊÂ
¾¡É¢Â í ¸û ¦¸¡ ñ ¨ ¼ì¸¼ ¨Ä, Àð¼¡½¢,
§Å÷ì ¸¼ ¨ Ä ÀÕôÒ, ±û, ¸õÒ, ¾ð ¨¼ôÀÂ¢Ú,
º¢ÕÀÂ¢Ú «øÄÐ À Î ¨ ºôÀÂ¢Ú Ó¾ÄÄ¢ÂÉ §¾ ¨ ÅÂ¡É
«Ç× ¯ ñ ¼À¢ý §¾ ¨ ÅÂ¡É ÀÆí ¸û º¡ôÀ¢¼Ä¡õ.
§ÁüÜÈ¢Â ¦¿Õôªø º ¨ Áì ¸¡¾ þÂü ¨ ¸Â¡É
¯½ × ¸ ¨ Ç ´ ýÈýÀ¢ý ´ ýÈ¡¸, ¿¢¾¡ÉÁ¡¸,
Å¡Â¢ø ¿ý Ì ¦ÁýÚ, « ¨ Ã¡òÐ, ¯Á¢ú¿¦Õ¼ý
¸ÄóÐ Ì ¨Èó¾Ð « ¨ Ã Á½¢ §¿Ã¡ÅÐ ¯½ × ì Ì Ì
´ Ðì ¸¢ ¯ ñ É §Å ñ Î õ. ¸¡ ¨Ä ¯½ Å¡¸ þðÄ¢,
À ¨ ÆÂ§º¡Ú «øÄÐ ÜÆ Å ¨ ¸ ¸û Ó¾ÄÄÂ ¦¿Õôªø
º ¨ Áò¾ ±ó¾ ¯½ ¨ ÅÔõ ¯ ñ ½ ò §¾ ¨ ÅÂ¢ø ¨ Ä.

10. ±Ç¢Â ¸¾÷ ¬ ¨ ¼¸û « ½¢ÅÐ º¢ÈôÒ ¨ ¼ÂÐ «øÄÐ ¨ ¸ò¾È¢ ¬ ¨ ¼¸û « ½¢ÅÐ ÀÃÅ¡Â¢ø ¨ Ä (¬ ñ ¸û ÀÉ¢Âý « ½¢Àò§¾ ¨ ÅÂ¢ø ¨ Ä)

11. Å¡¢ ¨ º ± ñ 9-ø Ì È¢ôÀ¢ð Î ûÇÅ¡Ú ¸¡ ¨ Ä ¯½ × ¾Å¢÷ôÀÅÃ¡¸Ç¢ý Á¾¢Âõ 12 Ó¾ø 1 Á½¢ì Ì û Ùõ, þÃü ¨ ¸ ¯½ × ¯ ñ ÀÅÃ¡¸Ç¢ý Á¾¢Âõ 1 Á½¢Ó¾ø 2 Á½¢ì Ì û Ùõ ¸¡úì Ì È¢ôÀ¢ð¼Å¡¢Ú Á¾¢Â ¯½ × ¯ ñ ½Ä¡õ. ÓÊó¾¡ø ¿ ñ À¸ø ¯½ × Å¡¢ ¨ º ± ñ 9-ø Ì È¢ôÀ¢ð Î ûÇÅ¡Ú º ¨ Áì ¸¡¾ þÂü ¨ ¸ ¯½ × ¸ ¨ Ç§ÀÂ ¯ ñ Ï ¾ø ¯ò¾Áõ. þÂÄ¡¦¾É¢ø, º ¨ Áò¾ ¸¡ö¸È¢¸û, ¸£ ¨ Ã¸û 75 º¾õ, §º¡Ú 25 º¾õ «øÄÐ º ¨ Áò¾ ¸¡ö¸È¢¸û 50 º¾õ §º¡Ú 50 º¾õ ±ýÈ «ÇÅ¢ø ¯ ñ ½ Ä¡õ ¨ ¸ ì Ì ò¾ø «¡º¢ §º¡Ú Á¢¸×õ ¿øÄÐ. (¾ü§À¡Ð ¿¡õ ¸¡ö¸È¢¸û 10 º¾õ, §º¡Ú 90 º¾õ ±ýÈ «ÇÅ¢ø ¦ÀÕõÀ¡Öõ ¯ ñ Ï ¸¢§È¡õ.) º ¨ ÁÂø ¯½ × Å ¨ ¸ ¸Ç¢ø ¯ôÒ §º÷ì ¸¡ÁÄÕó¾¡¡ø Á¢¸×õ ¿øÄÐ; ÒÇ¢, ¸¡Ãõ Á¢¸ì Ì ¨ ÈÅ¡¸ §º÷ì ¸Ä¡õ. « ¨ ºÅ ¯½ × ¸û ¾Å¢÷ò¾ø Á¢¸×õ ¿øÄÐ. À¡ø, ¾Â¢÷, §Á¡÷, ¦Å ñ ¦½ö, ¦¿ö, Óð ¨¼ Ü¼ ¾Å¢÷ì ¸ §Å ñ Î õ, ÀÍÅ¢ý À¡ø, ÀÍ í ¸ýÚì Ì ÊòÐ¾¡ý ; ÁÉ¢¾Õì Ì «øÄ ÁÉ¢¾ÃÐ À¡§Ä ÁÉ¢¾Õì Ì . ÀÍÅ¢ý À¡ø, ¿ÁÐ ¯¼ø « ¾¢ ¸î ºÇ¢ ¨ Â ²üÀÎ òÐõ. ¸ÕÅ¡ Î ¸û ¸ ñ ¦ÉôÀ¡¸ ¾Å¢÷ì ¸ §Å ñ Î õ. ± ñ ¦½¢ø Í ð¼ ¾¡ ¨ º, ± ñ ¦½¢ø ¾Â¡¡¢ò¾ À ñ ¼õ, ÀÄ¸¡Ãí ¸ ¨ ÇÔõ ¾Å¢÷ò¾ø þÕ¾Âò¾¢üÌ Á¢¸×õ ¿øÄÐ. ¾¡Ä¢ºõ ¦ºöÂ ± ñ ¦½ö Á¢¸ì Ì ¨ ÈÅ¡¸ ¯À§Â¡¸¢ò¾ø §Å ñ Î õ, ¾¡Ç¢º§Á ¦ºöÂ¡¾¢ÕôÀÐ¾ø ¯ò¾Áõ.

12. §¾ ¨ Å ¦ÂÉ¢ø Á¡ ¨ Ä 4 Ó¾ø 5 Á½¢ÂÇÅ¢ø ¸Õõ¨Îº¡Ú «øÄÐ ¬Ã ï Í, ¾¢Ã¡ð ¨ º, ÀôÀ¡Ç¢, §À¡¢ð ¨ º §À¡ýÈ ²§¾Ûõ ´ Õ ÀÆì¸º¡Ú «øÄÐ §¾ ¨ ÅÂ¡É «Ç× §¾ý ¸ÄóÐ ¾ ñ ½£÷ «Õó¾Ä¡õ.

13. Á¡ ¨ Ä 6 Ó¾ø 7 Á½¢ «ÇÅ¢ø þÃ× ¯½ Å¡¸ò §¾í ¸¡Ôõ, ÀÆí ¸ Ùõ º¡ôÀ¢¼Ä¡õ; «øÄÐ ± ñ 9-ø Ì È¢ôÀ¢ð Î ûÇÅ¡Ú þÃü ¨ ¸ ¯½ × ¸û º¡ôÀ¢¼Ä¡õ. «øÄÐ þ É¢ôÒ «Åø, ¸¡Ã «Åø º¡ôÀ¢¼Ä¡õ. §¾ ¨ ÅÂ¡É «Ç× «Åø, «Åø ° Úõ «Ç× ¾ ñ ½£÷ ¦¾ÇòÐ «ùÅ¢¾õ ° È¢Â «Åø ¸Õõ Ò ì ¸ð¼Êò à û, Á ñ ¨ ¼¦ÅøÄò à ÷, ¿¡ð Î º÷ì ¸ ¨ Ãò à û ²§¾Ûõ ´ ý ¨ È §¾ ¨ ÅÂ¡É «Ç× à Å¢ §¾ ¨ Å ¦ÂÉ¢ø §¾í ¸¡öò ÐÕÅø à Å¢ ¿ý Ì ÅÃ¢ÅÉ¢ø þÉ¢ôÒ «Åø ¾Â¡÷. §Áü Ì È¢ôÀ¢ð¼ Å¢¾õ ¾ ñ ½£÷ ¦¾Ç¢òÐ « Åø ÐÕÅ¢Â §¾í ¸¡ö à ÕÅø, º¢È¢Â Á¢Ç¸¡ö à Å¢, §¾ ¨ Å ¦ÂÉ¢ø ÐÕÅ¢Â §¸Ãð à Å¢ ¿ý Ì ÅÃ¢ÅÉ¢ø ¸¡Ã «Åø ¾Â¡÷. ÓÊÂ¡¾Å÷¸û ¬ÅÄ¢ø ¦ÅÓ¾ þðÄ¢, Òð Î , þÊÂôÀõ, ÅÈð Î ºôÀ¡ò¾¢, ¸Ç¢, Üú §À¡ýÈ ± ñ ¦½ö §ºÃ¡¾ º ¨ ÁÂø ¯½ × ¸ ¨ Ç ¯ ñ ½Ä¡õ.

14. þÃ× ¾¢Â¡Éõ ¦ºöÐÅ¢ð Î 9 Á½¢ Ó¾ø 10 Á½¢ «ÇÅ¢ø ÓÊó¾ «Ç× ¾¢Èó¾ ¦ÅÇ¢Â¢ø ÐÂ¢ø¦¸¡ûÅÐ ¿øÄÐ.

15. þÂý¨È¢ø Å¡Ãõ ´Õ ¿¡û ¯ ñ ½ ¡ §¿¡ ñ Ò ¦¸¡ûÇÄ¡õ.

¦¾¡¼Õõ....

OBITUARY

நமது பொதுக்குழு உறுப்பினர்
திரு. D. முருகேஷ்வரன் அவர்களின் பெரியப்பாவும் நமது நிரந்தர உறுப்பினருமான திரு. அ. பாண்டியத்தேவர் 04.11.2014 அன்று காலமானார் என்பதை வருத்தத்துடன் தெரிவித்துக்கொள்கிறோம்.

Repair, Restoration and Strengthening of Building Elements using Various Techniques

Colonel. P Nallathambi, ME(Structural Engg), MBA, FIE, FIV,
M/S Sakthi Consultancy Pvt. Ltd.

Introduction

Many times the existing beam, column, slab and foundation members in a building needs to be strengthened for various reasons. If there is any suspicion over the RC members having insufficient strength then various repairing, restoration and strengthening techniques are adopted to improve the strength of these members. Also suitable fastening methods are adopted to strengthening of members by mechanical anchorages. IS 15988 : 2013 Seismic Evaluation and Strengthening of Existing Reinforced Concrete Buildings — Guidelines, is particularly concerned with the seismic evaluation and strengthening of existing buildings and it is intended to be used as a guideline. It provides a method to assess the ability of an existing building to reach an adequate level of performance related to life-safety of occupants. Therefore, the emphasis is on identification of unfavourable characteristics of the building that could result in damage to either part of a building or the entire structure.

The method of repair and strengthening would naturally depend very largely on the structural scheme and materials used for the construction of the building in the first instance, the technology that is feasible to adopt quickly and on the amount of funds that can be assigned to the task, usually very limited. Some methods like splints and bandages, wire mesh with gunite, epoxy injection etc., have already been tried and applied in our countries for repairing as well as strengthening earthquake damaged buildings. Other possible methods will be discussed in the following paragraphs.

Strengthening of RC Beams.

Reinforced concrete beams need strengthening when the existing steel bars in the beam are unsafe or insufficient, or when the loads applied to the beam are increased.

Adding Reinforcement Steel Bars to the Main Steel Without Increasing the Beam Cross Sectional Area. when the reinforcing steel bars are not capable to carry the stresses applied to the beam then (a) The concrete cover is removed for both the upper and lower steel bars (b) The steel bars are well cleaned and coated with an appropriate material that would prevent corrosion (c) Holes are made, in the whole span of the beam under the slab, 15-25cm apart, a diameter of 1.3cm and extend to the total width of the beam (d) The holes are filled with an epoxy material with low viscosity and installing steel connectors for fastening the new stirrups (e) Steel connectors are installed into the columns in order to fasten the steel bars added to the beam (f)

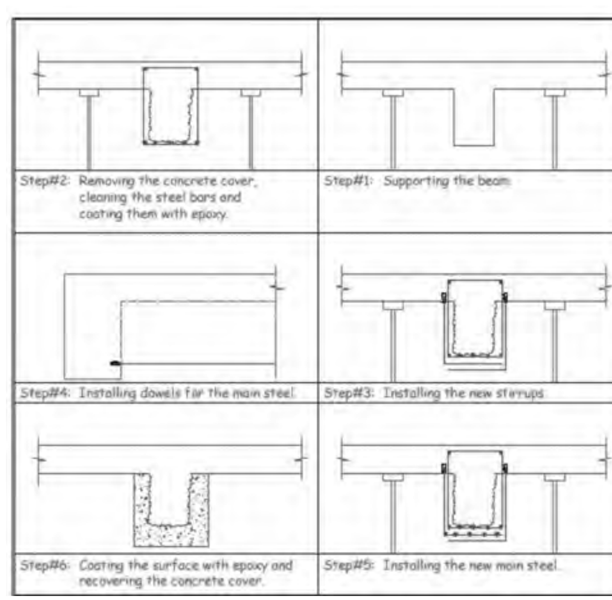

Fig.1- Strengthening a beam without increasing cross sectional area.

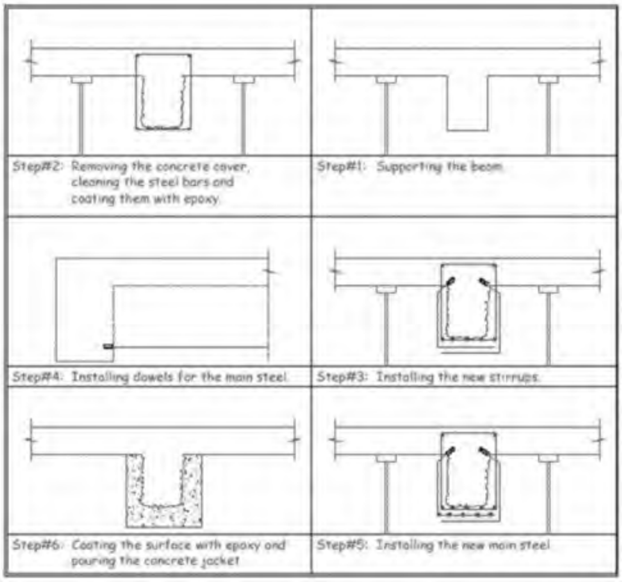

Fig.2: Strengthening of beam by increasing the cross-sectional area and bars

The added stirrups are closed using steel wires and the new steel is installed into these stirrups (g) The surface is then coated with a bonding epoxy material (h) The concrete cover is poured over the new steel and the new stirrups.

Increasing Both the Reinforcing Steel Bars and the Cross Sectional Area of Concrete. When both the steel and concrete are not able to carry the additional loads applied to the beam then (a) Remove the concrete cover, rough the beams surface, clean the reinforcement steel bars and coat them with an appropriate material that would prevent corrosion (b) Make holes in the whole span and width of the beam under the slab at 15-25cm (c) Fill the holes with cement mortar with low viscosity and installing steel connectors for fastening the new stirrups. (d) Install the steel connectors into the columns in order to fasten the steel bars added to the beam (e) Close the added stirrups using steel wires and the new steel is installed into these stirrups (f) Coat the concrete surface with an appropriate epoxy material that would guarantee the bond between the old and new concrete, exactly before pouring the concrete (g) Pour the concrete jacket using low shrinkage concrete.

Adding Steel Plates to the Beam. When it is required to strengthen the beam's resistance against the applied moment or shear stress, steel plates are designed with the appropriate size and thickness, then those plates are attached to the beam by (a) Roughing and cleaning the concrete surfaces where the plates will be attached (b) Coating the concrete surfaces with a bonding epoxy material (c) Making holes in the concrete surfaces and plates (d) Putting a layer of epoxy mortar on top of the plates with a 5mm thickness (e) Attaching the steel plates to the concrete using bolts.

Strengthening of RCC Columns.

Strengthening of reinforced concrete columns is needed when (a) The load carried by the column is increased due to either increasing the number of floors or due to mistakes in the design (b) The compressive strength of the concrete or the percent and type of reinforcement are not according to the codes' requirements. (c) The inclination of the column is more than the allowable (d) The settlement in the foundation is more than the allowable. There are two major techniques for strengthening reinforced concrete columns:

Reinforced Concrete Jacket. The size of the jacket and the number and diameter of the steel bars used in the jacketing process depend on the structural analysis that was made to the column. In some cases, before this technique is carried out, we need to reduce or even eliminate temporarily the loads applied to the column by putting mechanical jacks between floors or putting additional props between floors. Moreover, in some cases, where corrosion in the reinforcement steel bars was found then, remove the concrete cover, clean the steel bars using a wire brush or sand compressor then Coat the steel bars with an epoxy material that would prevent corrosion.

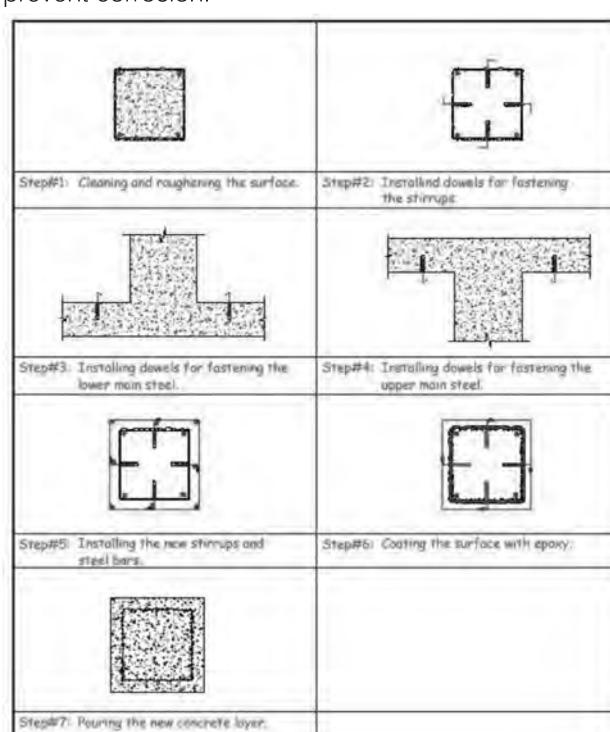

Fig:3. Increasing the cross-sectional area of column by RC jacketing.

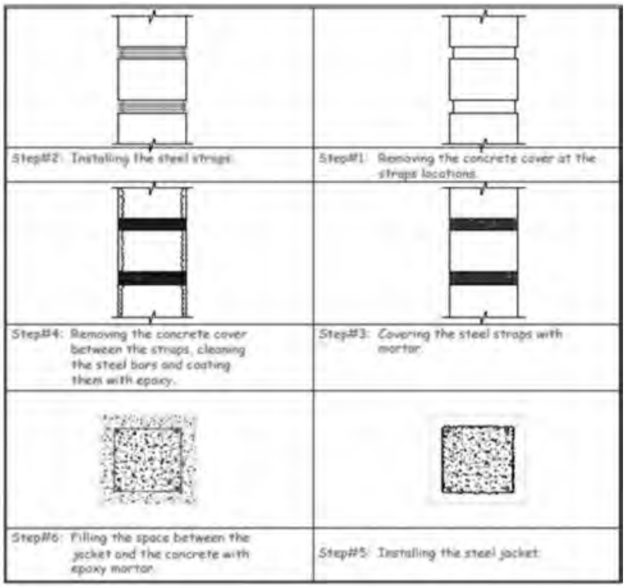

Fig:4. Increasing the cross-sectional area of column by steel jacketing.

Adding steel connectors into the existing column in order to fasten the new stirrups of the jacket in both the vertical and horizontal directions at spaces not more than 50cm.Those connectors are added into the column by making holes 3-4mm larger than the diameter of the used steel connectors and 10-15cm depth. Filling the holes with an appropriate epoxy material then inserting the connectors into the holes. Adding vertical steel connectors to fasten the vertical steel bars of the jacket . Installing the new vertical steel bars and stirrups of the jacket according to the designed dimensions and diameters. Coating the existing column with an appropriate epoxy material that would guarantee the bond between the old and new concrete. Pouring the concrete of the jacket before the epoxy material dries. The concrete used should be of low shrinkage and consists of small aggregates, sand, cement and additional materials to prevent shrinkage.

Steel Jacket is chosen when the loads applied to the column will be increased, and at the same time, increasing the cross sectional area of the column is not permitted then (a) Remove the concrete cover (b) Clean the reinforcement steel bars using a wire brush or a sand compressor (c) Coat the steel bars with an epoxy material that would prevent corrosion (d) Install the steel jacket with the required size and thickness, according to the design, and making openings to pour through them the epoxy material that would guarantee the needed bond between the concrete column and the steel jacket (e) Fill the space between the concrete column and the steel jacket with an appropriate epoxy material.

Strengthening of RC Slab

Strengthening of reinforced concrete slab is needed when (a) Increase in the applied loads (b) Mistakes or unsafe design (b) Rebar corrosion or insufficient number of bars (c) Cracks in concrete or stress less than design stress (d) The settlement in the foundation is more than the allowable.

If the slab is unable to carry the negative moment and the lower steel is sufficient, upper steel mesh should be added with a new concrete layer. If the slab is unable to carry the positive moment or when the dead load (that will be added to the slab) is much less than the live load carried by the slab , a new concrete layer on the bottom of the slab should be added.

The process of strengthening of slab involves (a) Remove the concrete cover (b) Clean the reinforcing steel bars using a wire brush or a sand compressor (c) Coat the steel bars with an epoxy material that would prevent corrosion (d) If a high percent of corrosion was found in the steel bars, a new steel mesh, designed according to the code requirements shall be added (e) The new reinforcing steel mesh is then installed and fastened vertically to the slab of the roof and horizontally to the surrounding beams, using steel dowels. (f) Coat the concrete surface with an appropriate epoxy material that would guarantee the bond between the

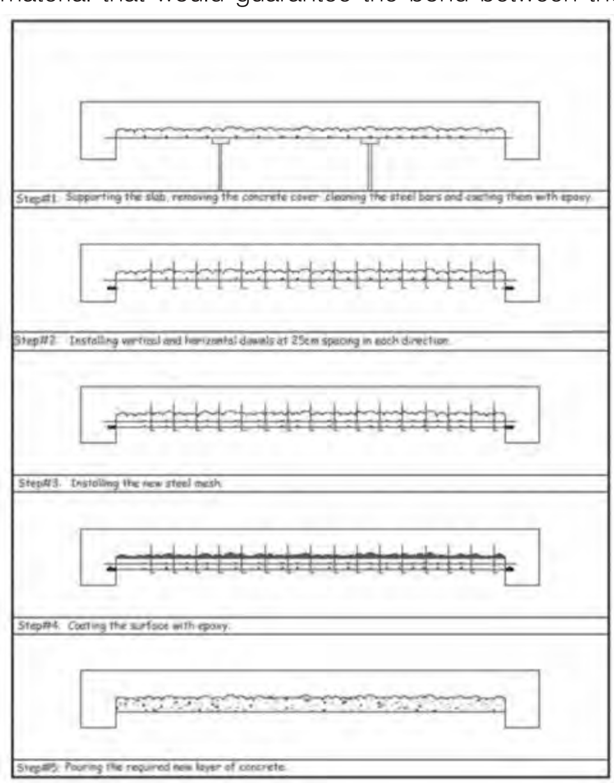

Fig.5: Strengthening a slab by increasing its depth from bottom

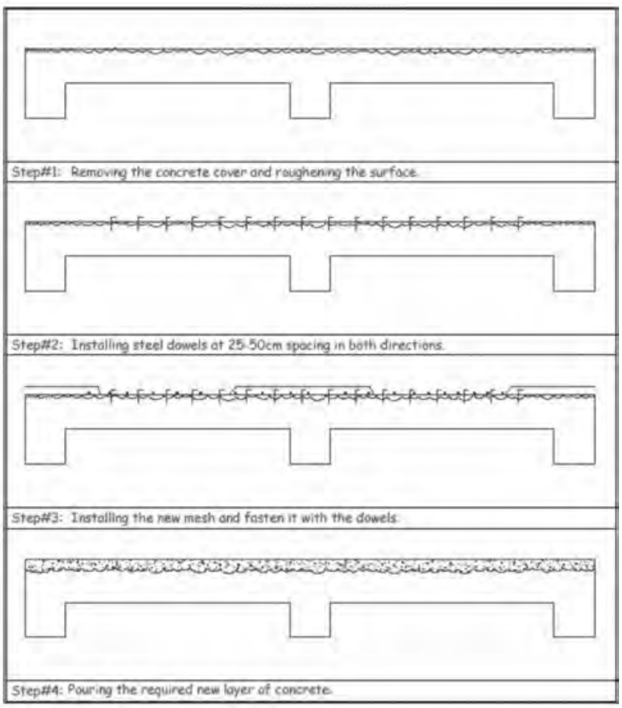

Fig.6: Strengthening a slab by increasing its depth from top.

old and new concrete (g) Before the epoxy dries, the concrete is poured with the required thickness. Additional materials that would lower the shrinkage should be added to the concrete.

Strengthening of Foundations

Columns foundations need strengthening in the case of applying additional loads. Widening and strengthening of existing foundations may be carried out by constructing a concrete jacket to the existing footings. The new jacket should be properly anchored to the existing footing and column neck in order o guarantee proper transfer of loads. The size of the "jacket" shall be selected such that the average maximum foundation pressure does not exceed the recommended allowable value. Attention shall be given during construction in order that the excavations for the new "jackets" do not affect the existing adjacent foundations.

An isolated footing is strengthened by increasing the size of the footing and the reinforcement steel bars as (a) Excavate around the footing (b) Clean and roughening the concrete surface (c) Install dowels at 25-30cm spacing in both directions using an appropriate epoxy material (d) Fasten the new steel bars with the dowels using steel wires. The diameter and number of steel bars should be according to the design (e) Coat the footing surface with a bonding agent in order to achieve the required bond between old and new concrete (f) Pour new concrete before the bonding agent dries but the new concrete should contain a non-shrinkage material.

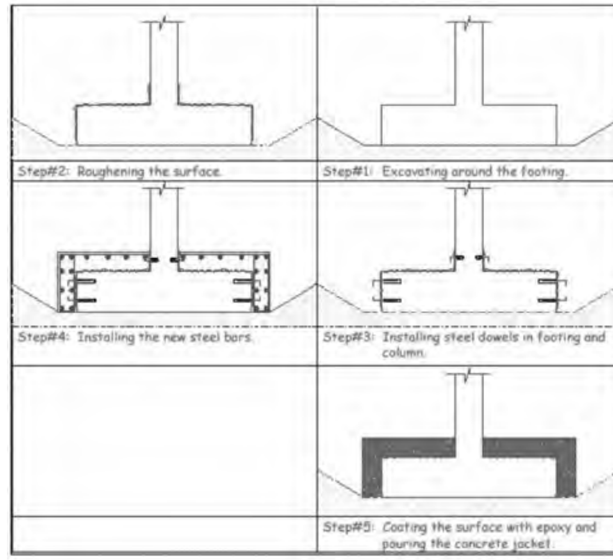

Fig.7: Steps for strengthening foundations.

(a) Excavation around the footing

(b) Installing the dowels

(c) Installing Main Steel

(d) Completing the Jacket

Fig. 8: Jacketing a footing by reinforced concrete.

New Rebar Connections With Existing RCC Beams and Columns (HILTI Method).

Reinforcement anchorages or splices that are fixed into already cured concrete by injection adhesives in drilled holes are called "Post-installed rebar connections" as opposed to normal, so called "cast-in" reinforcement. Many connections of rebars installed for good detailing practice will not require specific design considerations. But post-installed rebars which become part of the structural system have to be designed as carefully as the entire structure. In basic load situations, post-installed rebars behave like cast-in bars, a number of differences need to be considered in special design situations such as fire or load cases where hooks or bends would be required for cast-in anchorages.

Fastening Technology with reinforcement connections designed according to structural reinforced concrete design principles.

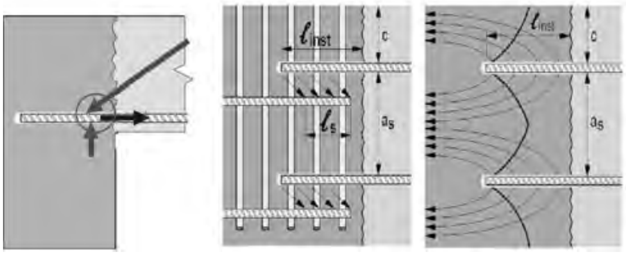

Fig.9 Structural rebar situations: "anchorage node in equilibrium" and "splice" anchor situation

The task of structural rebars is to take tensile loads and since concrete failure is always brittle, reinforced concrete design assumes that concrete has no tensile strength. Therefore structural rebars can end / be anchored in only two situations, (a) The bar is not needed anymore (the anchorage is a node in equilibrium without tensile stress in concrete (b) Another bar takes over the tensile load (overlap splice). Situations where the concrete needs to take up tensile load from the anchorage or where rebars are designed to carry shear loads should be considered as "rebar used as anchors" and designed according to anchor design principles.

Unlike in anchor applications, reinforcement design is normally done for yielding of the steel in order to obtain ductile behaviour of the structure with a good serviceability. The deformations are rather small in correlation to the loads and the crack width limitation is around wk ~0.3mm. This is an important factor when considering resistance to the environment, mainly corrosion of the reinforcement. In case of correct design and installation the structure can be assumed as monolithic which allows us to look at the situation as if the concrete was poured in one. Due to the allowed high loads the required embedment depth can be up to 80d (diameter of rebar).

Advantages of post-installed rebar connections

With the use of the Hilti HIT injection systems it is possible to connect new reinforcement to existing structures with maximum confidence and flexibility. Design flexibility, reliable, horizontal, vertical and overhead connections, form work simplification, defined load characteristics, simple and high confidence application are the advantages of Hilti post rebar connections.

(a) Misplaced bars

(b) Vertical/horizontal connections

(c) Wall Strengthening

(d) New slab constructions

(e) Slab Widening

(f) New Slab Construction

Application post-installed rebar connections. Post installed rebar connections are used in a wide range of applications, which vary from new construction projects, to structure upgrades and infrastructure requirements. Some of the applications are highlighted.

Conclusion.

Repairing restoring and strengthening of RC building elements are carried out to meet the demand of Earthquake forces and during various situations. It is essential for a site executives to understand the methods and its implications clearly so that the beams, columns, slabs and foundations are adequately strengthened to perform its desired requirements. Many firms have developed excellent adhesive materials, wrapping fibers and efficient post installed rebar connections to improve the RC member strength. Necessary calculations are performed and connections are designed methodologically before performing the anchorage of re-bars in Hilti method. Therefore, selection of suitable technique is very important during repair and strengthening of RC building elements.

Efficient and Cost Saving Seismic Retrofit / Upgrade of Reinforced Concrete High-Rise Building

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Abstract: Energy dissipation was used to retrofit a typical high-rise reinforced concrete building in California, it is estimated that hundreds of thousands of such buildings exist in India, which over a period of time do not meet even the minimum code standards as existing to date and can be classified as dangerous for its inhabitants. The building example presented has 14 stories and a basement. Concrete moment frames with limited ductility comprise the lateral-load resisting system. This structure was transformed from an old office building into a premier boutique hotel and the change in its end-use warranted a seismic check and ultimately a seismic upgrade as the building needed to satisfy California Building Code performance objectives. Performance Based Engineering revealed that the building would experience excessive story drift at its middle stories. This drift ratio could cause damage to both structural and especially to the historic architectural components. Energy Dissipaters were added to these critical stories to alleviate this deficiency and to satisfy the performance objectives. Sustainability of this structure was enhanced by using the innovative technology. The retrofit procedure was cost effective, speedy and less cumbersome when compared to conventional strategies. Such analysis methods and retrofit technology would be relevant to the existing stock of unsafe buildings in India. However this will involve some rigorous analysis methods which are beyond the rudimentary checks that the Indian Seismic Codes presently warrants.

Description of the Structure

The building is 200 ft (61 m) tall and has 14 stories and a full basement. It is located at the corners of 10th and J Streets in downtown Sacramento, California. Full-length perimeter walls span between the ground floors and the basement. The footprint for the original construction was L-shaped, measuring 80 x 120 ft (24 x 36 m) with a total area of approximately 70,000 ft2 (6,500 m2). Two later additions to the buildings were a 6-story, 23,000 ft2 (2,100 m2) annex in 1932, and a 2-story L-shaped annex in 1950. Figure 3 presents a photograph of the building. As seen in the figure, the building has many unique architectural features, including a terra cotta skin on the perimeter. Because of its many unique features, this building is considered a historic structure that must be preserved.

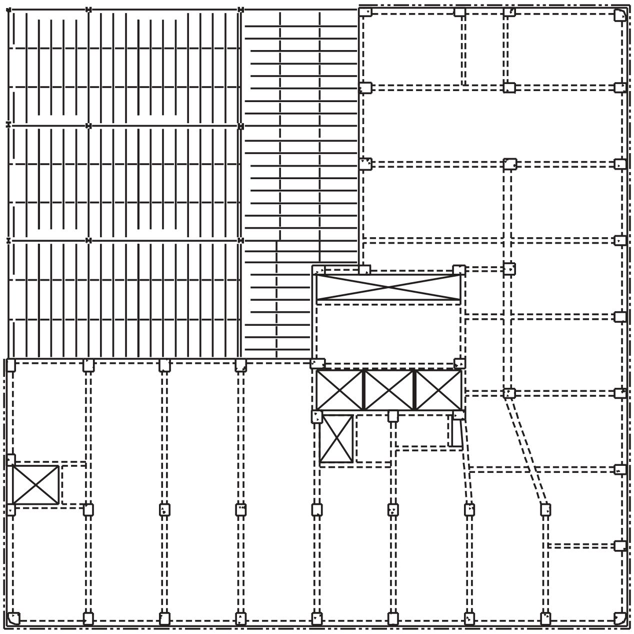
The gravity load-resisting system consists of 5- and 6-in. (125- and 150-mm) thick reinforced concrete one-way slabs supported on reinforced concrete beams and columns. Reinforced concrete moment frames resist lateral loading; see Figure 2. Additionally, between first and second floors, 8-in. (200-mm) thick reinforced concrete walls span the entire length on two faces. Reinforced concrete walls extended approximately half of length on two faces, between the second and third floors. At the lower levels, the concrete columns measure 24 in. (600 mm) square, and are reinforced with up to twenty 1-1/8 in. (29 mm) square bars. The transverse reinforcement for columns is 3/8 in. (9 mm) diameter bars at 4-in. (10-mm) spacing. Smaller column sizes and reinforcement are used at upper floors. A variety of beam sizes were used in the building. Typical beams measure 10 x 24 in. (250 x 600 mm) and are reinforced with two ¾- in. (19 mm) square bars at top and bottom. ½-in. (13 mm) diameter stirrups are used as beam ties. Deep spandrel beams up to 43 in. (1,100 mm) deep occur along the perimeter at the lower levels. Figure 3 presents the typical floor plans for the building.

Performance Objectives

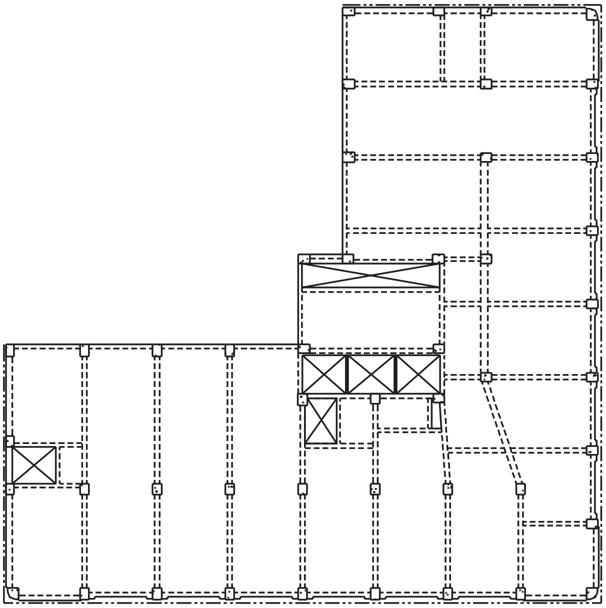
The building was originally designed as a mixed-use facility. In 2004, the owner decided to evaluate and undertake seismic evaluation of the building for use of California state government tenancy. This implied a one-level occupancy upgrade and the building had to meet the Life Safety (LS) performance for the Design Basis Earthquake (DBE). In 2006, it was decided to convert the building to a hotel. Since this meant a two-step upgrade in occupancy, the building now also had to meet Collapse Prevention (CP) for the Maximum Credible Event (MCE). These two performance objectives—LS at DBE level and CP at MCE level—were used in evaluations presented hereafter.

Figure 1. Photograph of the building

Figure 2. Reinforced concrete frames



a. Third floor



b. Eighth floor

Figure 2. Building typical floor plans

Seismic Demand

Geotechnical investigation [Singh, 2007] was conducted to determine the site-specific acceleration spectra for this building. DBE and MCE spectra (475-year and 2,500-year return periods, respectively) were developed based on the site geological evaluation, proximity of active faults, and historic seismic activities. Three sets of time histories were prepared to match each of the two spectra. The acceleration seeds were taken from the 1989 Loma Prieta earthquake. The DBE and MCE spectra are anchored at 0.2 and 0.25 g and have maximum spectral accelerations of 0.44 and 0.57 g, respectively.

Response of the Existing Building

Computer programs ETABS [CSI 2007a] and SAP 2000 [CSI-2007b] were used to prepare mathematical models of the building. All pertinent stiffness and mass components were included in the model. Compressive strengths of 5.2 and 4.6 ksi (39 and 32 MPa) were obtained for concrete columns and beams, respectively from material samples tested by Wallace-Kuhl [WK 2005]. Nominal properties of Grade 40 (275 MPa) steel were used for reinforcement. Nominal dimensions, as shown in contract plans were used in analysis. Member sizes and spans were verified during site visits. Beam-to-column connections were modeled as rigid. Concrete floor slabs were modeled as shell elements and rigid diaphragms were applied to them. Member plastic hinge properties were derived using the FEMA 356 [NHERP, 2000] recommendations. Conservatively, the stiffness contribution from the unreinforced masonry (URM) infills was ignored—and

		Mass participation, %		
Mode	**Period, sec**	**x-**	**y-**	**θ-**
1	2.2	59	4	6
2	2.1	4	58	3
3	1.9	1	2	54
4	0.8	12	3	1
5	0.8	2	11	0
6	0.7	0	0	11

Table 1. Modal Properties

equivalent struts were not included in the model because multiple windows perforate these infills; see Figure 4. The inertial weight of the building is estimated at 23,000 kips (100 MN).

Table 1 presents the modal properties of the building for the first six modes. In analysis, 18 modes were used to ensure that over 90% mass participation of the structure was accounted for. Note that the fundamental mode has a period of approximately 2.1 to 2.2 sec, the modes are uncoupled, and nearly 60% of the total mass participates in the first mode.

The building was subjected to the response spectrum loading and its response was evaluated. Analysis indicated that the building did not exhibit any irregular response; there was neither soft story response, nor, amplified torsional behavior. Figure 3 presents the displaced shape of the exterior frame subjected to response spectral loading in the x- (N-S) direction. Note that the maximum story drifts occur near the mid-height of the building, between fourth and eighth floors. Although, the story drifts are not excessive at these levels, they could potentially cause damage to the existing nonstructural elements, including the terra cotta and URM infill at these levels.

For regular structures with a dominant first mode response, such as the building under investigation, static nonlinear (pushover) analysis can be used to accurately estimate the seismic response of the building. The control node was selected at approximately the center of mass at the attic level. In each lateral direction, two loading patterns were considered: one resembling the deformed shape obtained from the response spectrum analysis, and the other proportional to the seismic mass at the floors (uniform acceleration). The structure was preloaded with gravity effects, then incrementally displaced to the target displacement computed from nonlinear response history analyses. The concept of equal displacement was utilized. Figure 4 presents the displaced shape of an exterior frame at target displacement of approximately 8 in. (200 mm) at the control node—a value close to the anticipated roof displacement during the DBE event.

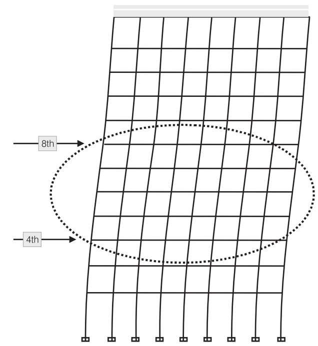


Figure 3. Response spectrum deformation

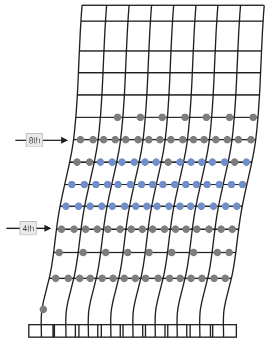


Figure 4. Displaced shape

The building global response is adequate as it meets the LS requirements. However, the largest drifts and plastic hinge rotations occur at the mid-height of the building; see Table 2 results of two-dimensional analysis at the DBE level. The mid-level floors experience large deformations and seismic demand on the concrete beams.

Seismic Retrofit

Fluid Viscous Dampers (FVDs) were used at mid-story levels to reduce the story drifts at these locations. The two main objectives of the retrofit were: 1) reduce plastic hinge rotations, and 2) protect the historic architectural components. FVDs provide an effective and economical method for retrofit of reinforced concrete structures. They are external devices, originally developed for shock and vibration control in the defense and aerospace industries. In the past decade, they have been used for seismic protection in both retrofit and new construction for many structures including reinforced concrete buildings. FVDs consist of a cylinder and a stainless steel piston. The cylinder is filled with incompressible silicone fluid that has stable proper-

Floor	Drift, %	PH rotation, % radian
Attic	0.18	0
12	0.26	0
11	0.38	0
10	0.54	0
9	0.67	0.03
8	0.73	0.25
7	0.65	0.58
6	0.53	0.79
5	0.47	0.77
4	0.37	0.37
3	0.12	0.05
2	0.13	0.08

Table 2. Story Drifts and Plastic Hinge Rotations, DBE Level

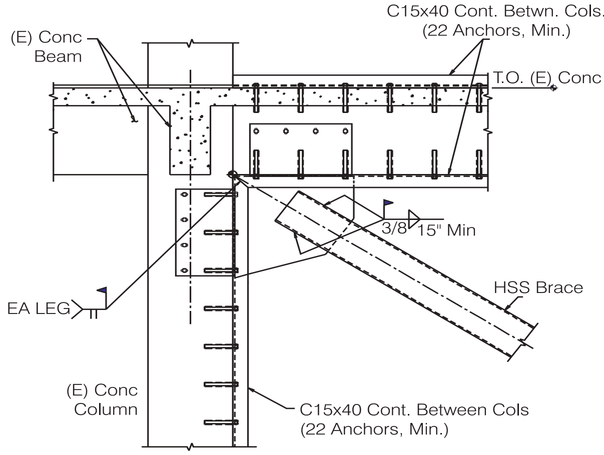


Figure 5. Connection detail (elevation)

ties over a wide range of operating temperatures. FVDs are activated by the transfer of the silicone fluid between chambers at opposite ends of the unit through small orifices. The mechanical construction and orifice properties can be varied to obtain the desirable damper properties.

Figure 5 shows the connection details for the FVDs. As shown, the damper forces are transferred to the existing concrete members. FRP collectors were then provided to transfer this force to the rest of frames. At each floor, two dampers were provided in each direction; see Figure 6. The damper properties were specified as required by FEMA 356 [NEHRP, 2000]. Figure 7 shows a photograph of an installed damper.

Response of the Retrofitted Building

FVDs, steel braces, and fiber-reinforced polymer (FRP) composites were used in the seismic upgrade. Sixteen FVDs were added between the fourth and eighth floors to reduce story drift ratios and seismic demand on the reinforced concrete members at these levels. Diagonal steel HSS braces were added between the first and second floors. These braces were placed opposite the existing 8-in. (200 mm) reinforced concrete wall and were intended to add lateral stiffness and reduce torsional response at this level. FRP was added to the floor slabs to serve as drag struts (collectors) and served to transmit and distribute the seismic forces between the damper bays and the floor diaphragms. The dampers have a velocity exponent (α) of 0.5 and a damping constant (C) equal to 300 kip-sec/in. (8.5 MN-sec/m). The steel connections at the ends of dampers and the components transferring the damper forces to the existing members were designed for the MCE level forces. Since these forces are substantially out-of-phase with elastic forces, they do not significantly increase loading on these existing members.

Nonlinear analyses were performed to assess the seismic response of the retrofitted building at the MCE and

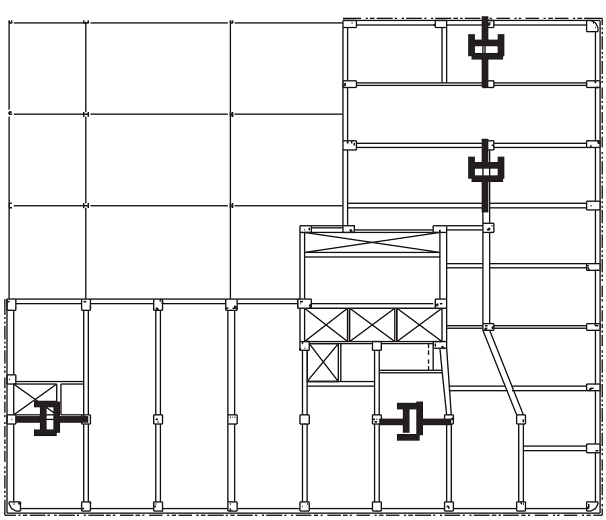


Figure 6. Typical location (plan)

Figure 7. Installed damper

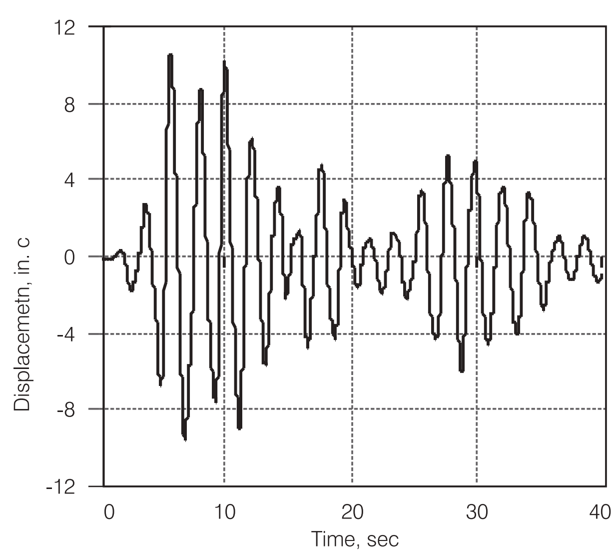


Figure 8. Roof displacement

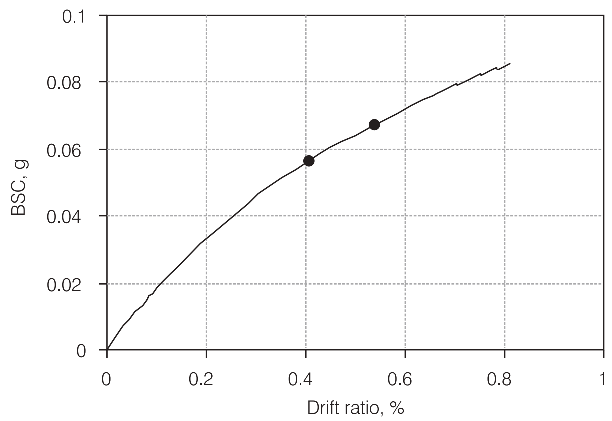


Figure 10. Normalized pushover curve

Floor	Existing	Retrofitted	Reduction, %
8	0.92	0.84	9
7	0.87	0.72	18
6	0.74	0.59	24
5	0.59	0.51	14

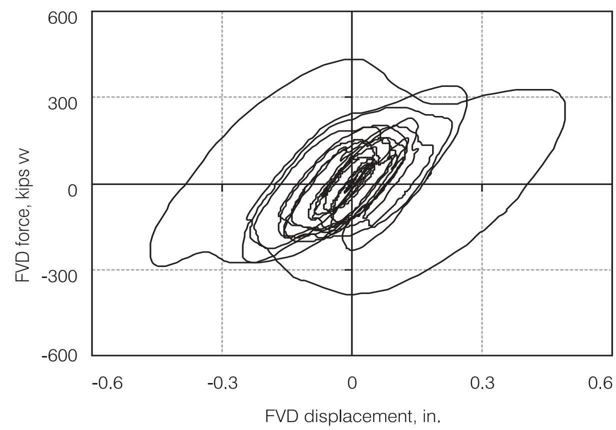
Table 3. Story Drift Reductions

MCE levels. Figure 8 presents the x-component of the computed displacements at the attic-level control node. The displaced shape of the building at this level of displacement is shown in Figure 9. Note that the building met its design objectives.

Figure 10 shows the normalized pushover curve for the building. The ordinates of roof displacement and base shear were normalized with respect to the building height and mass, respectively. The horizontal axis corresponds to an average drift ratio for the building and the vertical axis is its base shear coefficient (BSC). The DBE and MCE performance points are marked in the figure. The structure has substantial reserve capacity beyond the MCE demand. The analysis was carried up to a roof displacement of approximately 16 in. (400 mm)—significantly greater than the MCE target displacement. Although some of the plastic hinges in the concrete beams exceeded their CP level, the overall building response remained stable.

Table 3 presents the computed MCE drift ratios for the existing and retrofitted building obtained from the three-dimensional analyses. Only the drifts at the critical middle stories are shown. Note that the addition of dampers has reduced the story drifts by over 20%.

FVDs increase the equivalent damping of the building by dissipating the seismic energy. Figure 11a presents the nonlinear force-displacement hysteresis for one of the FVDs during one of the MCE event. The FVD absorbs significant energy. Figure 11b shows the component of the seismic energy for the same event. For clarity, the data is normalized. The dampers dissipate approximately 75% of input seismic energy. In the absence of the FVDs, the yielding of the existing concrete members would have been subject to this energy demand.



FVD response

Conclusions

1. State-of-the-art analysis of a reinforced concrete high-rise retrofitted with FVDs showed that the structure met its performance goals. Story drifts and member non-linear actions were kept within the acceptable limits. Achieving this using conventional technologies would have been difficult and far too expensive and cumbersome.
2. Performance-based earthquake engineering was effectively used to assess the seismic response of a reinforced concrete structure. This method readily identified a building weakness and enables designers to come up with methods to mitigate them.
3. FVDs provide an efficacious, efficient, cost-effective, and non-intrusive retrofit method. They act to increase the effective damping, do not stiffen the building, and reduce the seismic demand. The force in FVDs is primarily out-of-phase with the elastic forces and this greatly enhances the efficiency of dampers in absorbing the seismic forces without putting any additional force at any given point during a seismic event.

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08.12.2014 கலந்தாலோசனைக்கூட்டம்

ஜனவரி மாதம் 2015 10-ந்தேதி சென்னையில் நடைபெறவுள்ள மேலாண்மை மற்றும் பொதுக்குழுக் கூட்டம் பற்றியும் மற்றும் 13.12.14 அன்று நடைபெறவுள்ள VGP Aqua Water Park ல் Builders Day /Family Meet பற்றியும் நமது மய்ய அலுவலகத்தில் மாலை 4.00 மணி அளவில் கலந்தாலோசிக்கப்பட்டது. அதில் அகில இந்திய முன்னாள் தலைவர்
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ஒரு நாள் அடையாள உண்ணாவிரதப் போராட்டம்

Sand Lorry Owners Association சார்பாக ஒரு நாள் அடையாள உண்ணாவிரதப் போராட்டம் சென்னையில் நடைபெற்றது. அதில் சென்னைக்கு அருகைமையில் மணல் குவாரிகள் இல்லாத காரணத்தால் தற்போது திருச்சியிலிருந்து மணல் கொண்டு வருவதன் மூலம் அதிக செலவு ஏற்படுகிறது என்றும் உடனடியாக சென்னைக்கு அருகாமையில் மணல் குவாரிகள் ஏற்படுத்த வேண்டும் என்று தமிழக அரசுக்கு வேண்டுகோள் விடுக்கப்பட்டது. அகில இந்திய முன்னாள் தலைவர் திரு. R. இராதாகிருட்டிணன் அவர்கள் உண்ணாவிரதப் போராட்டத்தில் கலந்து கொண்டவர்களுக்கு மாலை பழரசம் அளித்து உண்ணாவிரதத்தை முடித்து வைத்து உரையாற்றினார். அப்போது பொதுக்குழு உறுப்பினர் திரு. L. சாந்தக்குமார் உடனிருந்தார்.

11.12.2014 நிறுவன திறப்புவிழா

Ruby Builders நிறுவனம் சார்பாக PVC windows / Doors தயாரிக்கும் கம்பெனி ஒன்றை ஆரம்பித்துள்ளார். அகில இந்திய முன்னாள் தலைவர் திரு. R. இராதாகிருட்டிணன் அவர்கள் இந்த விழாவில் முதன்மை விருந்தினராக கலந்து கொண்டு அந்த நிறுவனத்தின் செயல்பாடுகளை துவக்கி வைத்தார். அதில் மய்யத்தலைவர் திரு. R. சிவக்குமார், துணைத்தலைவர் திரு. O.K. செல்வராஜ், கவுரவ செயலாளர் திரு. A.N. பாலாஜி, உடனடி மய்யத்தலைவர் திரு. S. அய்யநாதன், செயற்குழு உறுப்பினர் திரு. S. நேதாஜி ஆகியோர் கலந்து கொண்டனர்

Awareness Programme

Hariharan Foundation நிறுவனத்தைச் சேர்ந்த ஒரகடத்தில் உள்ள பணியிடத்தில் தொழிலாளர்களுக்காக Personal Protective Equipment (PPE) உபயோகத்தைப் பற்றி விழிப்புணர்ச்சி முகாம் தென்னக மய்யம் சார்பாக ஏற்பாடு செய்யப்பட்டது. இந்த முகாம் காலை 10 மணி முதல் 1 மணி வரை நடைபெற்றது. இந்த முகாமில் Regional Labour Institute ல Govt. of India, Ministry of Labour & Employment சார்பாக அதிகாரிகள் கலந்து கொண்டு மேற்கண்ட பொருள் மீது பயிற்சி அளித்தனர். இந்த முகாமில் மய்யத்தலைவர்
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திரு. C. சதீஷ் குமார் மற்றும் குழுத் துணைத்தலைவர்
திரு. K. அண்ணாமலை ஆகியோர் கலந்து கொண்டனர்.

12.12.2014 மாநில அளவிலான கூட்டம்

தமிழ் நாடு மய்யத்தலைவர்கள் கூட்டம் மாநிலத்

தலைவர் திரு. D.R. சேகர் அவர்கள் தலைமையில் காலை 9.30 மணி அளவில் காஸ்மோ பாலிதன் கிளப்பில் நடைபெற்றது. இந்தக் கூட்டம் தென்னக மய்யம் சார்பாக செய்யப்பட்டது. (Host by Southern Centre) இந்தக் கூட்டத்தில் கீழ் கண்ட பொருள்கள் மீது கலந்தாலோசிக்கப்பட்டது.

1. E-Tendering
2. Next State Level Meeting at New Centre - at Andaman during Feb-20-21
3. Cement price hike
4. Sales Tax 2%
5. Represetnations to BIS

இந்த கூட்டத்தில் தென்னக மய்யம் சார்பாக அகில இந்திய முன்னாள் தலைவர்கள்
திரு. R. இராதாகிருட்டிணன் , திரு. M. கார்த்திகேயன், காப்பாளர் திரு.J.R. சேதுராமலிங்கம் , துணைத்தலைவர் திரு. L. மூர்த்தி, முன்னாள் மாநிலத்தலைவர்கள் திரு. P. நரசிம்மலு, திரு. Mu. மோகன், தென்னக மய்ய நிர்வாகிகள் உட்பட பல மற்றும் பல்வேறு மய்யத்தலைவர்கள் கலந்து கொண்டனர்.

13.12.2014 BUILDERS DAY / FAMILY MEET

தென்னக மய்யம் சார்பாக Builders Day/Family Meet நிகழ்ச்சி VGP Aqua Kingdom Water Park, சென்னையில் கடற்கரையோரம் மிகவும் சிறப்பாக Builders Day குழுத்தலைவர் திரு. G. திலகர், துணைக்குழுத்தலைவர் திரு. V.S. இராமக்கிருட்டிணன், Family Meet குழுத்தலைவர் திரு.G. திவாகர், துணைக்குழுத்தலைவர் திரு. R. பாலசுப்பிரமணியன் மற்றும் குழு உறுப்பினர்கள் ஏற்பாடு செய்து இருந்தார்கள். எதிர்பாராத மழையின் காரணமாக சிறிதும் சிரமம் பாராமல் குழந்தைகள், பெண்கள், ஆண்கள் ஆகியோருக்கான நிகழ்ச்சிகள் உள் அரங்கத்தில் மாற்று ஏற்பாடு செய்யப்பட்டது. வயலின் இசை நிகழ்ச்சி எல்லோரையும் கவர்ந்தது. கட்டுநர் நண்பர்களின் குடும்ப உறுப்பினர்கள், உள்பட 400க்கும் மேற்பட்டோர் கலந்து கொண்டனர்.

17.12.2014 நான்காவது மேலாண்மைக்குழுக் கூட்டம்

அகில இந்திய நான்காவது மேலாண்மைக்குழுக் கூட்டம் கவுதம புத்தர் நகர், கிரேட்டர் நொய்டாவில் நடைபெற்றது. தென்னக மய்யம் சார்பாக அகில இந்திய முன்னாள் தலைவர் திரு. R.இராதாகிருட்டிணன், அகில இந்திய துணைத்தலைவர் (தெற்கு) திரு. L. மூர்த்தி மற்றும் மேலாண்மைக்குழு உறுப்பினர் திரு. S. கணபதி ஆகியோர் கலந்து கொண்து தங்கள் கருத்துக்களை பதிவு செய்தனர்.

23.12.2014மாலை சிறப்பு செயற்குழுக்கூட்டம் .

சிறப்பு செயற்குழுக்கூட்டம் ஓட்டல் அசோகா எழும்பூர் சென்னையில் நடைபெற்றது. அக்கூட்டத்தில் 30,12,2014 அன்று நடைபெற உள்ள மய்யத் தேர்தல் 2015-16 பற்றி கலந்தாலோசிக்கப்பட்டது. அதில் அலுவலக நிர்வாகிகள் , செயற்குழு / பொதுக்குழு உறுப்பினர்கள், மேலாண்மைக்குழு உறுப்பினர்கள் அகில இந்திய தலைவர்கள், மாநில செயலாளர் மற்றும் முன்னாள் மாநிலத்தலைவர்கள், மூத்த தலைவர்கள் ஆகியோர் கலந்து கொண்டனர்.

29.12.2014 Town and Country Planning சார்பாக கூட்டம்

Framing of rules and guidelines for effective implementation of regularization of Buildings பற்றிய பொருள் மீது Town & Country planning சார்பாகக் கூட்டம் CMDA Conference hall வ Egmore , Chennai -8ல் நடைபெற்றது. அக்கூட்டத்தில் CMDA துணைக்குழுத் தலைவர் திரு. S. இராமப்பிரபு அவர்கள் தென்னக மய்யம் சார்பாக கலந்து கொண்டு தன் கருத்தை பதிவு செய்தார்.

30.12.2014 மய்யத் தேர்தல் - 2015-16

தென்னக மய்யத்தின் பொதுக்குழு கூட்டம் ஓட்டல் அசோகா எழும்பூர் சென்னையில் மாலை 4 மணி முதல் 6 மணி வரை நடைபெற்றது. மய்யத்தலைவர் திரு. R. சிவக்குமார் அவர்கள் கூட்டத்திற்கு வந்திருந்த அனைவரையும் வரவேற்று தேர்தல் அதிகாரியாக நியமிக்கப்பட்ட திரு. M. கார்த்திகேன் அவகர்ளை தேர்தல் 2015-16க்கான செயல்முறைகளை மேற்கொள்ளும்படி கேட்டுக்கொண்டார்.
இந்தியாவிலேயே பெரிய மய்யமான தென்னக மய்யத்தின் 2015-16 ஆண்டிற்கான தேர்தல் அறிக்கை ஜனநாயக முறைப்படி அறிவிக்கப்பட்டு மய்யத்தின் தலைவர், கவுரவ செயலாளர், கவுரவ பொருளாளர், செயற்குழு / பொதுக்குழு உறுப்பினர்கள் Patron Category ஆகியோர் போட்டியின்றி ஏகமனதாக தேர்ந்தெடுக்கப்பட்டு தேர்தல் முடிவினை தேர்தல் அதிகாரி திரு. M. கார்த்திகேயன் அவர்கள் அறிவித்தார்.

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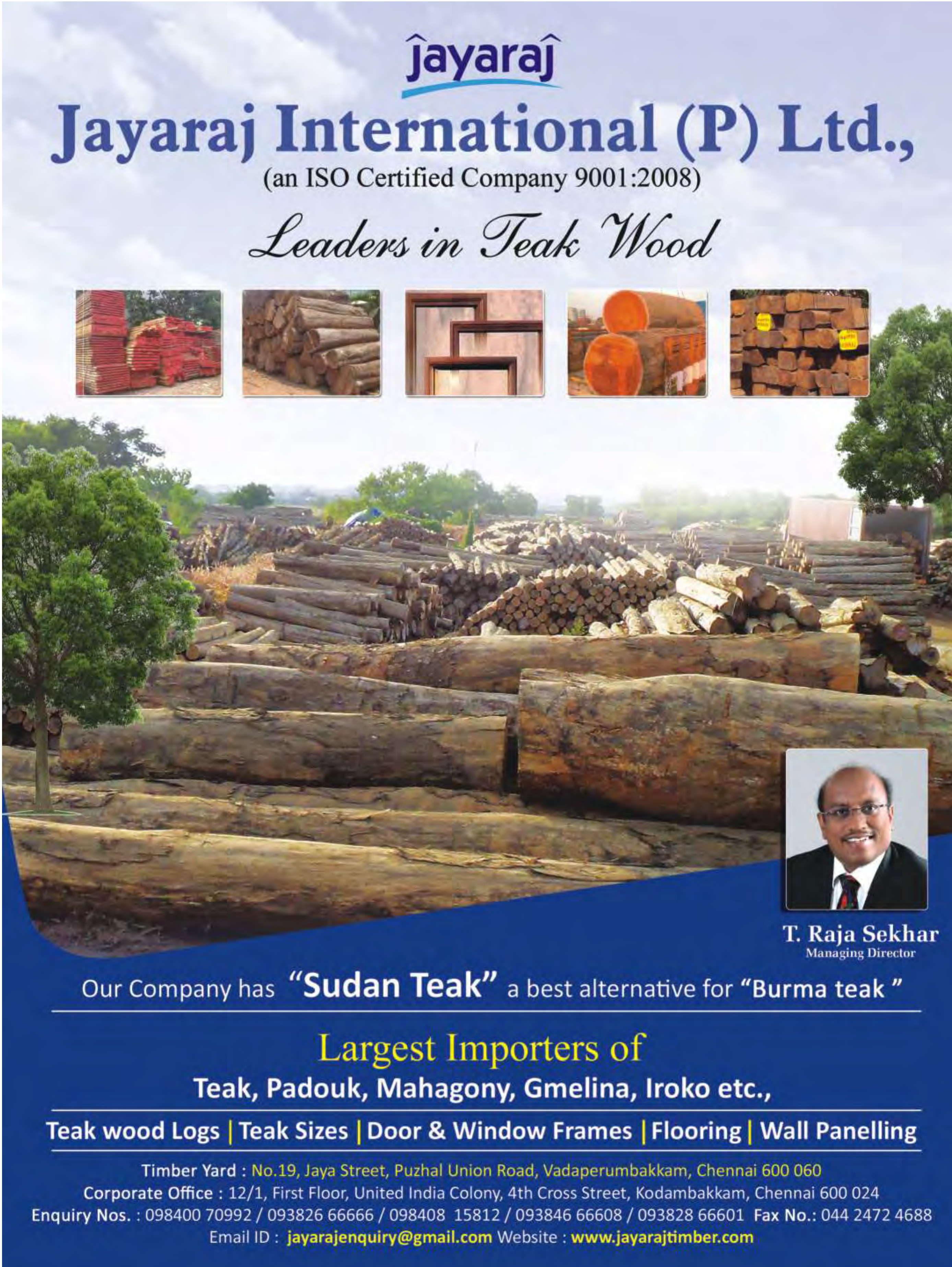
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