Southern Builder

Bulletin of Builders Association of India - Southern Centre

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SEPTEMBER 2021

XXX ALL INDIA BUILDERS CONVENTION

XXX ALL INDIA BUILDERS' CONVENTION

Role of construction in nation building

February 11, 12 & 13, 2022

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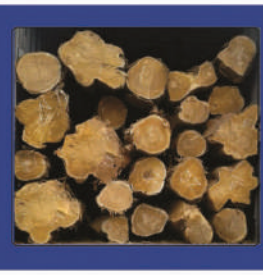






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Builders' Association of India
Southern Centre
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CONTENTS

ஆசிரியர் மடல்

அன்புடையீர் வணக்கம்,

இந்த உலகத்தில் எல்லா படைப்புகளும் பஞ்சபூதங்களை அடிப்படையாகக் கொண்டது. நிலம், நீர், நெருப்பு, காற்று, ஆகாயம் என்னும் ஐம்பூதங்களின் உதவியோடு இயங்கப்படுவதுதான் உலகம். அதனை அறியாது மனிதன் வஞ்சகம் கொண்டு வாழ்க்கையில் ஐம்பூதங்களையும் அழித்து வாழ முயல்வதைக் கண்டு ஐம்பூதங்களும் சிரித்துக் கொள்கின்றன. ஒவ்வொரு மனிதனுக்கும் பாரபட்சம் பார்க்காமல் இயற்கை அன்னையால் வழங்கப்பட்ட கொடைதான் இயற்கை வளங்களென்றால் அது மிகையாகாது. அப்படி வரமாகப் பெற்ற வளங்களை மதித்து, காத்து அதன் அழகை ரசித்து அடுத்த சந்ததியினருக்கு பாதுகாப்போடு கொண்டு சேர்ப்பது ஒவ்வொரு மனிதனின் நன்றி மறவாத கடமையாகும்.

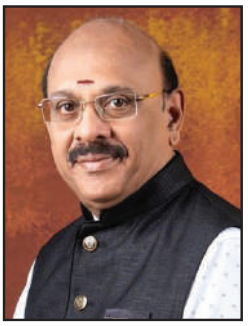
ஆதி காலத்தில் மனிதர்கள் பஞ்சபூதங்களையும் வணங்கி வழிபட்டு வாழ்ந்து வந்தார்கள். ஆனால் இன்றைய காலக்கட்டத்தில் மனிதன் பஞ்சபூதங்களோடு போரிட்டுக் கொண்டிருக்கிறான். அதற்கு இயற்கையானது கொடுக்கும் தண்டனைதான் வறட்சி, பூமி அதிர்வு, காட்டுத்தீ, எரிமலை, பனி மலை உருகி வெள்ளம், கடல்மட்ட உயர்வு என்று பல்வேறு துயர்களை மக்கள் எதிர்கொள்ளும் பேராபத்து நிகழ்ந்து வருகிறது. இன்றைய சூழலில் இயற்கை அன்னையின் கோபத்திற்கும், சீற்றத்திற்கும் பாரபட்சமின்றி உலகம் இரையாகிக் கொண்டிருக்கின்றது என்பது ஒரு கசப்பான உண்மை. சுதந்திர காற்றை சுவாசிக்க முடியாமல் சிரித்த முகத்தை காண முடியாமல் முகக்கவசம் அணிந்து வாழும் காலமாக இருந்து கொண்டிருக்கிறது. உலகையே உலுக்கியது மட்டுமல்லாது இன்று உருமாறி உறுமிக்கொண்டிருக்கும் கோவிட் 19 என்னும் கொடிய வைரஸ் தாக்குதலிலிருந்து மக்களை மீட்டெடுக்க ஆய்வாளர்கள், மருத்துவ விஞ்ஞானிகள் அரும்பாடுபட்டு வருகிறார்கள். இந்த சூழ்நிலையில்தான் இன்று உலகில் பல்வேறு நாடுகளில் நிகழும் இயற்கை பேரிடர் செய்திகளால் மனித குலத்தின் எதிர்காலம் கேள்விக்குறியாகியுள்ளது.

பருவநிலை மாற்றத்திற்கான பன்னாட்டு அரசுக்குழு IPCC தனது ஆறாவது மதிப்பீட்டு அறிக்கையை வெளியிட்டுள்ளது. அதில் வெப்ப சலனம், வளிமண்டல மேலடுக்கு சுழற்சி, காற்றின் மாசு ஆகியவற்றிற்கான சிவப்பு எச்சரிக்கை (Red Alert)அறிவிப்பு விடுத்துள்ளது. காற்று மாசு அடைவதினால் மனிதன் வாழ் நாள் ஆண்டு கணக்கில் குறைந்து வருவதாக ஆய்வுகள் கூறுகின்றன. ஆகவே இதனை சிந்தித்து செயல்பட்டு காட்டழிப்பு, காட்டுயிர் அழிப்பு, காற்று, நீர் நிலை மாசுபடுத்துதல் என இயற்கைக்கு எதிர்மறையான செயல்பாடுகளை முற்றிலுமாக தவிர்த்து விழிப்புணர்வுடன் சூரிய ஒளி (Solar Power) காற்றாலை மின்சாரம் (Wind Power) பயன்படுத்துதல், மரம் வளர்த்தல், நீர் நிலை பாதுகாப்பு என்பனவற்றை கடைபிடித்து சுற்றுசூழல் பாதுகாப்பு அறிவியல் ஆய்வாளர்கள் விஞ்ஞானிகள் கூறும் அறிவுரைகள், எச்சரிக்கைகளை மனதில் ஏற்று இயற்கையோடு ஒன்றி வாழ்ந்து நம்மையும் பாதுகாத்து கொள்வதோடு அல்லாமல் நம் வாழ்க்கை முறையினால் வருங்கால சந்ததியினரின் நல்வாழ்விற்கு வழிகாட்டிடும் தருணம் இதுவே ஆகும்.

என்றும் அன்புடன்
S. அய்யநாதன்

மய்யத்தலைவர் மடல்

அன்பார்ந்த நண்பர்களே வணக்கம்,



02.09.2021 அன்று கட்டுநர் சமுதாயத்தின் கோரிக்கைகளில் பெரும்பாலானவற்றை நிறைவேற்றி எஞ்சியவற்றை ஆய்வு செய்து விரைவில் நல்ல முடிவுகளை அறிவிப்பதாக வாக்களித்த மாண்புமிகு தமிழக முதல்வர் திரு. மு.க. ஸ்டாலின் அவர்களுக்கும் அமைச்சர் பெருமக்களுக்கும் நன்றி தெரிவிக்கும் விதமாக மாநிலத்தலைவர் திரு. R. சிவக்குமார் அவர்களது தலைமையில் பத்திரிக்கையாளர் கூட்டம் பிரஸ் கிளப்பில் நடத்தப்பட்டது.

நமது மய்யத்தின் உறுப்பு நிறுவனமான சொசைட்டியின் 38வது மகாசபைக் கூட்டம் கடந்த 07.09.2021 அன்று நமது அலுவலக கூட்ட அரங்கில் சிறப்பாக நடைபெற்றது. சொசைட்டியின் தலைவர் திரு. K. அண்ணாமலை அவர்களின் தலைமையில் நடைபெற்ற மகாசபைக்கூட்டத்தில் அகில இந்திய முன்னாள் தலைவரும் காப்பாளருமான திரு. பீஷ்மா R. இராதாகிருட்டிணன் அவர்கள், உடனடி அகில இந்திய முன்னாள் தலைவர் திரு. Mu. மோகன் அவர்கள், தென் மண்டல II செயலாளர் திரு. K. வெங்கடேசன் அவர்கள், மாநிலத்தலைவர் திரு. R. சிவக்குமார் அவர்கள், மாநிலச் செயலாளர் திரு. S. இராமப்பிரபு அவர்கள், தென்னக மய்ய நிர்வாகிகள் மற்றும் உறுப்பினர்கள் அனைவரும் கலந்து கொண்டனர்.

நமது மய்யத்தின் 71வது மகாசபைக்கூட்டம் 14.09.2021 அன்று நமது அலுவலக கூட்ட அரங்கில் வெகு சிறப்பாக நடைபெற்றது. தொடர்ந்து 49வது முறையாக மகாசபைக்கூட்டத்தில் கலந்து கொண்ட பீஷ்மா R. இராதாகிருட்டிணன் அவர்களோடு உடனடி முன்னாள் அகில இந்தியத் தலைவர் திரு. Mu. மோகன் அவர்கள் தென் மண்டல –II ன் அகில இந்தியத் துணைத்தலைவர் திரு. S. அய்யநாதன் அவர்கள், மாநிலத்தலைவர் திரு. R. சிவக்குமார் அவர்களோடு, தென் மண்டல II–ன் செயலாளர் திரு. K. வெங்கடேசன் அவர்களும், மாநில மற்றும் மய்ய நிர்வாகிகள், முன்னோடிகள் உறுப்பினர்கள் கலந்து கொண்டு சிறப்பித்தனர்.

29.09.2021 அன்று பொதுப்பணித்துறை கூட்ட அரங்கில் 74வது Product Assessment Committee கூட்டத்தில் மாநிலத்தலைவர் திரு. R. சிவக்குமார் அவர்களும், முன்னாள் மய்யத்தலைவர் திரு. L. வெங்கடேசன் அவர்களும் கலந்து கொண்டு நமது கருத்துக்களை பதிவு செய்தனர்.

வரும் அக்டோபர் 8 மற்றும் 9 தேதிகளில் நடைபெறவுள்ள மாநில அளவிலான மேலாண்மை மற்றும் பொதுக்குழு கூட்டம் தென்னக மய்யத்தின் உபசரிப்பில் ஓட்டல் Feathers–ல் நடைபெறவுள்ளது என்பதனை மகிழ்ச்சியோடு தெரிவித்துக் கொள்கிறேன்.

அக்டோபர் 29 அன்று கட்டுநர் தின விழாவினை நடத்துவதற்கு ஏற்பாடுகள் செய்யப்பட்டு வருகின்றன. மய்ய உறுப்பினர்கள் அனைவரும் கட்டுநர் தின விழாவில் கலந்து கொண்டு விழாவினை சிறப்பிப்பதோடு மய்யத்திற்கு பெருமை சேர்க்க வேண்டுமெனவும் கேட்டுக்கொள்கிறேன்.

சென்ற இதழில் கூறியது போல 30வது அகில இந்திய கட்டுநர் மாநாட்டிற்கான முன் பதிவு சிறப்பாக நடைபெற்று வருகிறது. கட்டணச் சலுகையை பயன்படுத்தும் விதமாக அக்டோபர் 31க்குள் அனைவரும் முன் பதிவு செய்து கொள்ள வேண்டுகிறேன். அகில இந்திய மாநாட்டினை வெகு சிறப்பாக நடத்தவதற்கான ஆயத்தப்பணிகள் தொடர்ந்து நடைபெற்று வருகிறது. அனைத்து உறுப்பினர்களும் தங்களது முழு ஆதரவினை தந்து மாநாட்டினை சிறப்பாக நடத்த ஒத்துழைப்பு தருமாறு அன்போடு வேண்டுகிறேன்.

என்றும் அன்புடன்
L. சாந்தகுமார்

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT

OFFICE OF THE ENGINEER-IN-CHIEF (BUILDINGS) &
CHIEF ENGINEER (BUILDINGS), CHENNAI REGION, PWD, CHENNAI-5.

Present: ***Er. R. Viswanath, M.E. (Structures),***
Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), Chennai Region,
PWD, Chennai-5.

Proceedings No. HDO (A) / 00926 / 2021-3, dated 13.09.2021

Sub: Cement – Basic Cost for **CEMENT** for adoption in the preparation of estimates during the year **2021-2022** with effect from **13.09.2021** – Approved – Communication of – Regarding.

Ref: Engineer-in-Chief, WRD & Chief Engineer (General), PWD, Chennai-5, Proceedings No. HDO / Sr.DO-2 / SSR 2020-21 / 20021 / 2020-3, dated 20.04.2020.

The **Basic Cost of Cement (excluding all taxes and GST)** for the year 2021-2022 approved by the Schedule of Rates Committee for adoption in the preparation of estimates during the year 2021-2022 **with effect from 13.09.2021** is given below:

Cement : Rs.5,960/- per MT

(Rupees Five Thousand, Nine Hundred and Sixty only)

2.0. The above rate is excluding all taxes & GST, freight charges, etc., at Stockyard / Dealer's Godown. Necessary lead charges (i.e. excluding loading and unloading charges), as applicable as per conveyance table, may be allowed from the Stockyard / Dealer's Godown to the site of work, if duly certified by an officer not below the rank of Assistant Executive Engineer.

3.0. However, in the case, if the source is specified as "Stockyard", the same shall be decided and approved by the Superintending Engineers concerned.

Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), PWD,
Chennai Region, Chennai-5.

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT

OFFICE OF THE ENGINEER-IN-CHIEF (BUILDINGS) &
CHIEF ENGINEER (BUILDINGS), CHENNAI REGION, PWD, CHENNAI-5.

Present: ***Er. R. Viswanath, M.E. (Structures),***
Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), Chennai Region,
PWD, Chennai-5.

Proceedings No. HDO (A) / 00926 / 2021-2, dated 13.09.2021

Sub: Steel – Basic Cost for **STEEL** for adoption in the preparation of estimates during the year **2021-2022** with effect from **13.09.2021** – Approved – Communication of – Regarding.

Ref: Engineer-in-Chief, WRD & Chief Engineer (General), PWD, Chennai-5, Proceedings No. HDO / Sr.DO-2 / SSR 2020-21 / 20021 / 2020-2, dated 20.04.2020.

The **Basic Cost of Steel (excluding all taxes and GST)** for the year 2021-2022 approved by the Schedule of Rates Committee for adoption in the preparation of estimates during the year 2021-2022 **with effect from 13.09.2021** is given below:

Steel : Rs.51,750/- per MT

(Rupees Fifty One Thousand, Seven Hundred and Fifty only)

2.0. The above rate is excluding of all taxes & GST, freight charges, etc., at Stockyard / Dealer's Godown. Necessary lead charges (i.e. excluding loading and unloading charges), as applicable as per conveyance table, may be allowed from the Stockyard / Dealer's Godown to the site of work, if duly certified by an officer not below the rank of Assistant Executive Engineer.

3.0. However, in the case, if the source is specified as "Stockyard", the same shall be decided and approved by the Superintending Engineers concerned.

Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), PWD,
Chennai Region, Chennai-5.

ANNEXURE-I

RATES OF LABOUR

Sl. No.	Sch. Item No.	Description of Labour	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
I		**HIGHLY SKILLED CATEGORY**		
1	76A	Technical Assistant Grade-I (B.E.Passed)	Day	1049.00
2	76B	Technical Assistant Grade-II (Diploma in Engg. Passed / B.E. Failed / Degree in Geology for Ground Water Works)	Day	945.00
3	76C	Technical Assistant Grade-III (Diploma in Engg. Failed / ITI (Civil) Passed)	Day	799.00
4	76D	Cinema Operator (ITI Passed)	Day	659.00
5	77A	Laboratory Assistant Grade-I (Post Graduate in Science)	Day	799.00
6	77B	Laboratory Assistant Grade-II (Degree in Science / Degree in Geology for Ground Water)	Day	732.00
7	77C	Laboratory Assistant Grade-III (With Degree Qualification to work as Works Clerk)	Day	659.00
8	76E	B.Sc., (Agriculture) Passed	Day	945.00
9	89A	Computer Operator Grade-I [B.E. (Computer Science) / M.Sc., (Computer Science)]	Day	1049.00
10	89B	Computer Operator Grade-II [B.Sc. (Computer Science) / Diploma in Computer Science]	Day	945.00
11	100	Wireman Grade-I / Electrician Grade-I	Day	712.00
II		**SKILLED CATEGORY**		
12	4	Blacksmith-I Class	Day	663.00
13	11	Carpenter-I Class	Day	842.00
14	15	Cleaner-First Grade	Day	448.00
15	19	Fitter-I Class	Day	760.00
16	20	Fitter (Pipe Laying / Bar Bending)-I Class	Day	747.00
17	21	Floor Polisher	Day	663.00

Sl. No.	Sch. Item No.	Description of Labour	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
18	25	Hammer Mazdoor	Day	533.00
19	27	Driver (Light Duty)	Day	663.00
20	27A	Driver (Heavy Duty)	Day	708.00
21	36	Maistry, Road Inspector & Work Inspector	Day	639.00
22	36A	Maistry, Road Inspector & Work Inspector (Degree Holder)	Day	708.00
23		Skilled Mason Class-I for Heritage Work	Day	1215.00
24		Skilled Mason Class-II for Heritage Work	Day	1062.00
25	37	Mason for Brick Work-I Class	Day	861.00
26		Skilled Sthapathy Brick Mason for Heritage Work	Day	1519.00
27	38	Mason for Stone Work-I Class	Day	861.00
28		Skilled Sthapathy Stone Mason for Heritage Work	Day	1519.00
29	40	Mechanic-I Class	Day	663.00
30	44	Painter / Varnisher-I Class	Day	688.00
31	46	Pile Driver	Day	611.00
32	47	Plumber-I Class	Day	747.00
33	52	Sawyer	Day	611.00
34	54	Smith-I Class	Day	661.00
35	56	Stone Cutter-I Class	Day	661.00
36	58	Syrang-I Class	Day	661.00
37	62	Tinker-I Class	Day	533.00
38	63	Turner-I Class	Day	611.00
39	64	Time Keeper-I Class	Day	661.00
40	67	Welder / Bracer-I Class	Day	661.00
41	72	Wodder	Day	556.00
42	81	Compressor Operator	Day	584.00
43	97	Geological Assistant	Day	817.00
44	98	Stone & Crusher Operator	Day	584.00

Sl. No.	Sch. Item No.	Description of Labour	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
45	101	Wireman Grade-II / Electrician Grade-II	Day	708.00
46	103	Lift Operator	Day	639.00
47	104	Laboratory Attendant	Day	476.00
48	105	Sound Service Operator	Day	533.00
49	106	Electrical Maistry	Day	817.00
III		**SEMI SKILLED CATEGORY**		
50	2	Axe Mazdoor	Day	525.00
51	4A	Blacksmith-II Class	Day	637.00
52	8	Bullocks Pair with Driver (with Bandy)	Day	1039.00
53	8A	Bullocks Single with Driver (with Bandy)	Day	747.00
54	12	Carpenter-II Class	Day	804.00
55	15A	Cleaner-Second Grade	Day	443.00
56	19A	Fitter-II Class	Day	739.00
57	20A	Fitter (Pipe Laying / Bar Bending)-II Class	Day	724.00
58	22	Gardener	Day	525.00
59	28	Jumper Mazdoor	Day	525.00
60	37A	Mason for Brick Work-II Class	Day	804.00
61	38A	Mason for Stone Work-II Class	Day	804.00
62	39A	Mazdoor Category-I	Day	562.00
63	39C	Head Mazdoor	Day	581.00
64	40A	Mechanic-II Class	Day	637.00
65	44A	Painter / Varnisher-II Class	Day	666.00
66	47A	Plumber-II Class	Day	724.00
67	48	Pump Driver	Day	581.00
68	54A	Smith-II Class	Day	637.00
69	56A	Stone Cutter-II Class	Day	637.00
70	58A	Syrang-II Class	Day	637.00

Sl. No.	Sch. Item No.	Description of Labour	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
71	60	Thatcher	Day	556.00
72	62A	Tinker-II Class	Day	525.00
73	63A	Turner-II Class	Day	581.00
74	64A	Time Keeper-II Class	Day	637.00
75	67A	Welder / Bracer-II Class	Day	637.00
76	78A	Mazdoor employed for Geological maping	Day	562.00
77	78B	Mazdoor employed for Pitting, Trenching, Sampling & Drilling works	Day	562.00
78	78C	Mazdoor employed for Geophysical investigation works	Day	562.00
79	78D	Head Mazdoor to Supervise exploratory works	Day	594.00
80	79	Mixer Operator (including concrete mixer)	Day	611.00
81	80	Mixer Driver	Day	581.00
82	99	Heavy Mazdoor	Day	611.00
83	102	Electrical Helper	Day	556.00
IV		**UN-SKILLED CATEGORY**		
84	39B	Mazdoor Category-II	Day	461.00
NOTE:				
1	The Basic Rate adopted under this Head, "Annexure-I – Rates of Labour" is exclusive of all taxes and GST.			
2	**The Rates of Labour other than mentioned above shall be adopted from the Schedule of Rates issued by the Engineer-in-Chief, Water Resources Department, Chennai-5**			

Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), PWD,
Chennai Region, Chennai-5.

ANNEXURE-II

RATES OF MATERIALS

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
		A. BRICKS AND TILE PRODUCTS		
	1	Second Class Table Moulded Chamber Burnt Bricks		
1	a	9" x $4^1/_2$" x 3"	1000 Nos.	7695.00
2	b	9" x $4^3/_8$" x $2^3/_4$"	1000 Nos.	7400.00
	2	Second Class Ground Moulded Chamber Burnt Bricks		
3	a	9" x $4^1/_2$" x 3"	1000 Nos.	6630.00
4	b	9" x $4^3/_8$" x $2^3/_4$"	1000 Nos.	6435.00
	3	Third Class Country Brick Kiln Burnt		
5	a	$8^3/_4$" x $4^1/_4$" x $2^3/_4$"	1000 Nos.	5570.00
6	b	$8^3/_4$" x $4^1/_4$" x $2^1/_4$"	1000 Nos.	4380.00
7	c	$8^3/_4$" x $4^1/_4$" x 2"	1000 Nos.	4195.00
	3A	Fly Ash Bricks		
8	a	230 x 110 x 70mm	1000 Nos.	6435.00
	b	230 x 110 x 75mm	1000 Nos.	6630.00
	4	Specially Moulded Country Brick for well steining		
9	a	$8^3/_4$" x $4^1/_4$" x 2"	1000 Nos.	2465.00
10	b	Perforated Bricks 19 x 9 x 9cm	1000 Nos.	3760.00
11	c	Terrace Bricks 15 x 7.5 x 2.5cm	1000 Nos.	965.00
12		Special Bricks 8" x 4" x 2" for Heritage Works	1000 Nos.	13040.00
13		Terrace Bricks 6" x 3" x 1" for Heritage Works	1000 Nos.	9780.00
14		Wire Cut Bricks for Heritage Works		
a		Size 9" x 4" x 3"	1000 Nos.	13040.00
b		Size 9" x 4" x 2"	1000 Nos.	10870.00
c		Size 9" x 6.5" x 2"	1000 Nos.	16300.00
	8	Flat Tiles		
15	a	15cm x 15cm x 12mm	1000 Nos.	7890.00
16	b	15cm x 15cm x 20mm	1000 Nos.	9370.00

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
	10	Brick Jelly		
17	a	40mm size	cum.	688.00
18	b	20mm size	cum.	767.00
	11	Pressed Tiles		
19	a	20 x 20 x 2cm	1000 Nos.	11356.00
20	b	23 x 23 x 2cm	1000 Nos.	16106.00
	12	Pan Tiles		
21	a	23cm x 8cm x 1.7cm	1000 Nos.	437.00
22	b	16.5cm x 8cm x 1.7cm	1000 Nos.	360.00
	13	Best Mangalore Tiles		
23	a	I Class'A'	1000 Nos.	10490.00
24	b	Class 'AA'	1000 Nos.	10700.00
25	c	Best Mangalore Ridge Tiles	1000 Nos.	30700.00
26	d	Best Mangalore Ceiling Tiles	1000 Nos.	6450.00
27	e	Best Mangalore Glass Roofing Tiles	Each	301.00
28	f	Best Mangalore Ventilating Tiles (Single)	Each	45.00
29	g	Best Mangalore Ventilating Tiles (Double)	Each	57.00
	23A	Mosaic Flooring Tiles (Grey)		
30	a	Mosaic (Grey) Tile 25 x 25 x 2cm	1000 Nos.	11790.00
31	b	Mosaic (Grey) Tile 20 x 20 x 2cm	1000 Nos.	7530.00
	23C	Mosaic (other Colour)		
32	a	Mosaic (other colour) Tile 25 x 25 x 2cm	1000 Nos.	16270.00
33	b	Mosaic (other colour) Tile 20 x 20 x 2cm	1000 Nos.	9600.00
34	c	Mosaic (Green) Tile 20 x 20 x 2cm	1000 Nos.	11790.00
35	d	Mosaic (Green) Tile 25 x 25 x 2cm	1000 Nos.	18490.00
36	24	Mosaic Chequered Tile Grey Colour Size 25 x 25 x 2 cm	1000 Nos.	14800.00
37		Attangudi Tiles for Heritage Works		
a		Size 8" x 8" x 3/4"	Each	26.70
b		Size 10" x 10" x 3/4"	Each	32.40

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
		B. STONE AND ROAD MATERIALS		
38	27	Rough Stone for masonry works (Hard Granite)	cum.	445.00
39	29a	Cut Stone Pillar of size 0.15 x 0.15 x 2.1m	Each	164.00
40	30a	From boulders without blasting for masonry	cum.	146.00
41	32	Course Rubble Stone for masonry works	cum.	355.00
42	33	Course Rubble Stone for Arch works	cum.	385.00
43	36	Ashlar Arch Stone Fully Dressed to size all faces	cum.	4845.00
44	38	Flooring Stone SS Size (Not less than 10cm thick)	sqm.	353.00
45	42	Bond Stones	cum.	642.00
	48	**Hard Broken Granite Stone Jelly (I.S.S.) Machine crushed / Hand broken**		
46	i	HBGS Jelly 90mm size	cum.	440.00
47	ii	HBGS Jelly 80mm size	cum.	493.00
48	iii	HBGS Jelly 63mm size	cum.	569.00
49	iv	HBGS Jelly 50mm size	cum.	661.00
50	v	HBGS Jelly 40mm size	cum.	1029.00
51	vi	HBGS Jelly 25mm size	cum.	884.00
52	vii	HBGS Jelly 20mm size	cum.	1432.00
53	viii	HBGS Jelly 12mm size	cum.	1329.00
54	ix	HBGS Jelly 10mm size	cum.	977.00
55	x	HBGS Jelly 6mm size	cum.	661.00
56	xi	HBGS Jelly 3mm size	cum.	595.00
57	49 b	Quartz metal		
a	i	Quartz Metal 50mm	cum.	96.80
b	ii	Quartz Metal 40mm	cum.	97.80
58	52	Laterite 40 to 75mm size	cum.	96.80
59	53	Kankar 40 to 75mm size	cum.	96.80
60	54	Soling Stones unblasted 15cm cube	cum.	113.00
61	54a	Soling Stones blasted 15cm cube	cum.	184.00
62	57	Gravel	cum.	216.30

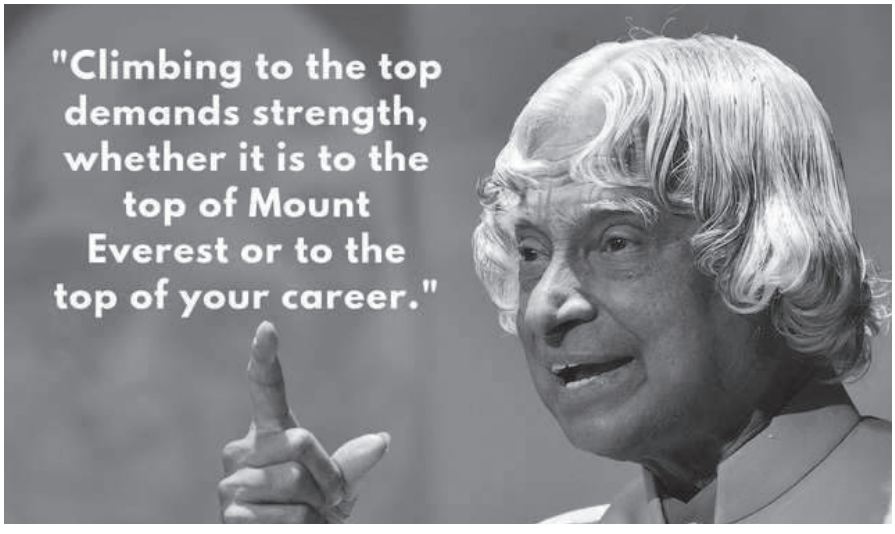
Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
63	57A	Well Gravel	cum.	161.70
64	57B	Screened Kankar Gravel	cum.	118.40
65	58	Quarry Rubbish	cum.	95.70
66	58A	Stone Dust	cum.	122.50
67	58B	Pond Ash (wet / dry)	cum.	94.70
68	58C	Crushed Stone Sand (Commercially called M-Sand)	cum.	1280.00
69	58D	Plastering Sand (P-Sand)	cum.	1285.00
70	59	Sand for Mortar *	cum.	447.00
71	60	Sand for Filling *	cum.	447.00
72	62	Clay for Puddle & Masonry	cum.	37.00
73	63 (i)	Cuddapah Slab 50mm Thick	sqm.	421.00
74	ii	Cuddapah Slab 38 / 40mm Thick	sqm.	404.00
75	iii	Cuddapah Slab 20 / 30mm Thick	sqm.	373.00
		C. Lime		
76	66	Shell Lime (Slaked & Screened)	cum.	1322.00
77	67	Freshly Slaked & Screened Burnt Lime Stone	cum.	974.00
78	68	Stone Lime or Lime Metal	cum.	84.00
79		Unslaked Pollachi Lime for Heritage Works	cum.	10345.00
		D. Timber and Roofing Materials		
80	71	TW Scantlings (over 3m for joist and rafters) - Malabar	cum.	116600.00
81	72	TW Scantlings (for Tiebeams and principal rafters) - Malabar	cum.	114700.00
82	73	TW Scantlings (over 2m & below 3m in length) - Malabar	cum.	111600.00
83	74	TW Scantling (below 2m in length) - Malabar	cum.	99400.00
84	75 (i)	TW Planks (over 45cm wide & 12mm thick)	cum.	123100.00
85	ii	TW Planks (30-45cm wide & 12mm thick)	cum.	114300.00
86	iii	TW Planks (30-45cm wide & 12-25mm thick)	cum.	107000.00
87	iv	TW Planks (30-45cm wide & 25-40mm thick)	cum.	102600.00
88	v	TW Planks (15-30cm wide & 12mm thick)	cum.	99900.00
89	vi	TW Planks (15-30cm wide & 12-25mm thick)	cum.	95000.00

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
90	vii	TW Planks (15-30cm wide & 25-40mm thick)	cum.	93100.00
91	viii	TW Planks (upto 15cm wide & 12mm thick)	cum.	91300.00
92	ix	TW Planks (upto 15cm wide & 12-25mm thick)	cum.	91300.00
93	x	TW Planks (upto 15cm wide & 25-40mm thick)	cum.	86200.00
94		Seasoned Teakwood for Scantling and Planks for Heritage Works	cum.	185200.00
	76	Teak Wood Reepers		
95	i	TW Reepers 50 x 25mm	RM	76.00
96	ii	TW Reepers 50 x 12mm	RM	61.00
	77	Country Wood Scantling		
97	i	CW Scantling (upto 4m in length)	cum.	34300.00
98	ii	CW Scantling (over 4m in length)	cum.	36200.00
99	77A	CW Scantling for tie beams & principal rafters for trusses	cum.	36200.00
100	77B	Jack Wood Scantlings (upto 4m)	cum.	37900.00
101	77D	Silver Oak Scantlings	cum.	15500.00
	78	Country Wood Planks		
102	i	CW Planks (upto 30cm wide-40mm thick)	cum.	39400.00
103	ii	CW Planks (upto 30cm wide-25mm thick)	cum.	39400.00
104	iii	CW Planks (over 30cm wide-40mm thick)	cum.	39400.00
105	iv	CW Planks (over 30cm wide-25mm thick)	cum.	39400.00
106	78A	JW Planks (25-40mm thick)	cum.	41300.00
107	78B	Silver Oak Plank (40mm thick)	cum.	17600.00
108	78C	Bluegum Plank	cum.	18100.00
	79	Country Wood Reepers		
109	i	CW Reepers (50 x 25mm)	RM	34.60
110	ii	CW Reepers (50 x 12mm)	RM	24.90
111	80	Mango Plank	cum.	16700.00
112	81	Palmyrah Rafter (50-60mm wide & 125mm depth)	RM	49.50
113	a	Palmyrah Leaves	100 Nos.	255.00

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
114	b	Palmyrah Leaves (labour for cutting)	100 Nos.	40.20
	90	Casurina Poles		
115	a	Casurina Poles 13cm-15cm dia	RM	33.00
116	b	Casurina Poles 10cm-13cm dia	RM	25.20
117	c	Casurina Poles 8cm-10cm dia	RM	19.20
118	d	Casurina Poles 5cm-8cm dia	RM	17.50
	90.1	Eucalyptus Poles		
119	a	13cm to 15cm dia	RM	33.00
120	b	10cm to 13cm dia	RM	23.60
121	c	8cm to 10cm dia	RM	19.20
122	d	5cm to 8cm dia	RM	16.40
123	e	Below 5cm	RM	15.00
124	90.2	Eucalyptus Bullies 4cm to 5cm dia and cross ties	RM	12.00
125	91	Casurina Bullies 4cm-5cm dia & cross ties	RM	13.50
126	92	Bamboo Large (10cm dia and above)	RM	12.00
127	93	Bamboo (7.5cm-10cm dia)	RM	10.60
		E. Metal and Iron Items		
128	111	Mild Steel Plates or Sheets BG 10	Kg	47.30
129	112	Mild Steel Angles 25 x 25 x 3 mm	Kg	47.30
130	113 a	Binding Wire (Black 18 G)	Kg	50.30
131	113 b	Binding Wire (Galvanised-18 G)	Kg	50.30
132	114	GI Sheets 30cm wide and 1.6mm thick	sqm.	349.00
133	126 i	Weld Mesh 7.5 x 2.5cm 10 Gauge	sqm.	339.00
134	ii	Weld Mesh 7.5 x 5cm 10 Gauge	sqm.	303.00

Sl. No.	Sch. Item No.	Description of Materials	Unit	Basic Rate approved for the year 2021-2022 (w.e.f. 13.09.2021)
135	iii	Weld Mesh 10 x 10cm 10 Gauge	sqm.	164.00
136	129	Chicken Mesh	sqm.	36.30
137	130	Fly Proof Mesh	sqm.	104.00
138	131	Supplying Mild Steel Grills for windows, ventilators, etc., including priming coat	Kg	62.60
Note:				
1	For road works, the Schedule of Rates of Highways Department may be adopted in respect of materials for which rates are not available in this schedule of Rates.			
2	For all the materials viz. Bricks and Tile Products, Stone Jelly, Gravel, Sand, Lime Stone, etc., necessary incidental charges, loading charges and unloading charges have been included in the basic cost of materials listed above. Hence, no separate incidental charges, loading charges and unloading charges shall be allowed for the above materials.			
3	The Basic Rate adopted under this Head, "Annexure-II – Rates of Materials" is exclusive of all taxes and GST.			
4	* The cost of sand as indicated Sl. No.70 & 71 and Schedule Item No.59 & 60 is at Government Sand Depot.			
5	**The Rates of Materials other than mentioned above may be adopted from the Schedule of Rates issued by the Engineer-in-Chief, Water Resources Department, Chennai-5**			

Engineer-in-Chief (Buildings) &
Chief Engineer (Buildings), PWD,
Chennai Region, Chennai-5.



ABSTRACT

Public Works Department – Cancellation of 'Package Tender System' for inviting tenders for building works in Public Works Department – Orders - Issued – Regarding.

Public Works (G2) Department

G.O.(Ms) No.139

Dated:27.09.2021
Pilava Andu, Purattasi-11
Thiruvalluvar Aandu-2052

Read:

1. G.O.(Ms)No.17, Public Works (G2) Department, dated 15.2.2019.
2. From the Engineer in Chief (Buildings) and Chief Engineer (Buildings), Chennai Region, Public Works Department, Chennai Letter No.HDO/ A/20180-1/ 2018-1, dated 05.07.2021.

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ORDER:

In Government Order first read above, sanction has been accorded for inviting tenders under "Package Tender System" by following all the tender procedures for execution of the Building Works by the Buildings Organisation of PWD in order to speed up the tender / execution process, subject to the certain conditions and it has been ordered among other conditions, that the package tender system shall be applicable without any financial monetary limit for the works.

2. In the letter second read above, the Engineer-in-Chief (Buildings) and Chief Engineer (Buildings), Chennai Region, Public Works Department, Chennai has stated that during the meeting held by the Hon'ble Minister for Public Works Department with the PWD Contractors and Officials of Public Works Department on 19.06.2021, the following points have been discussed in detail:-

(i) The Package Tender System ordered in the Government Order first read above introduced monopoly in the construction works carried out by the contractors, in various departments of the State of Tamil Nadu.

(ii) By enhancing the eligibility criteria, only a very few contractors in the entire State will be benefited and thousands of contractors will be affected which in turn will affect the large number of labourers depending upon them.

(iii) Financially sound contractors and capable of executing works simultaneously with their available man power, machinery and the centring material required for completing the works in time is the basis of passing the Govt. Order and it is against the Directive Principles of State Policy which prevents the concentration of wealth among the few and there is no data to show that the contractors executing works simultaneously for completing the works in time.

(iv) Based on the orders issued in the Government Order first read above only a few contractors in the State of Tamil Nadu will be eligible to participate in the tenders, since they alone would have the financial wherewithal to participate in such huge tenders. As a result, most number of small and middle scale contractors and their workers will suffer due to the present package tender system.

3. The Engineer-in-Chief (Buildings), Public Works Department has further stated that based on the discussions held during that Meeting convened by the Hon'ble Minister for Public Works Department on 19.06.2021, decision was taken to withdraw the Government Order first read above and recommended to withdraw the said Government Order. He has also informed that Court Cases are pending before the Hon'ble High Court of Madras at Chennai and also before the Hon'ble Madurai Bench of Madras High Court at Madurai challenging the orders issued in the Government Order first read above.

4. During the discussion on Public Works Department Demand No.39 held on the floor of the Legislative Assembly on 27.08.2021, the Hon'ble Minister for Public Works Department has made announcement that Package Tender System will be cancelled.

5. In view of the above, the Government after careful examination, decided to accept the proposal of the Engineer in Chief (Buildings) and Chief Engineer (Buildings), Chennai Region, Public Works Department, Chennai and the Government hereby order that the sanction accorded in the Government Order first read above for inviting tenders under "Package Tender System" stands cancelled.

6. This order comes in to force from the date of issue of this order.

7. This order issues with the concurrence of Finance Department vide its U.O. No.37663/PW-I/2021, dated 24.09.2021.

(BY ORDER OF THE GOVERNOR)

SANDEEP SAXENA
ADDITIONAL CHIEF SECRETARY TO GOVERNMENT

//FORWARDED / BY ORDER //

SECTION OFFICER.

HONOURING THE EQUIPMENT EXPERT

V.G. Sakthi Kumar is the Managing Director of SCHWING Stetter (India) Private Limited.

Mr. V.G. Sakthi Kumar holds a Bachelor's Degree in Chemical Engineering and a Master's of Business Administration from the School of Management, Pondicherry University.

He has been associated with SCHWING Stetter, since its inception in India in 1998, and has played an important part in its growth story. He has over three decades of industry experience in the Ready-Mix Concrete and Construction Machinery Business. He took charge as Chief Operating Officer in 2006, and since then he has made significant contributions to the building the brand. Having consolidated SCHWING Stetter's position in India, he went forward to establish Schwing Brand in SAARC and reestablished Schwing Stetter's position in ASEAN and AFRICA.

He started his prolific career with Greaves Cotton, heading the Sales operation for the Southern Region. Going forward, he joined M/s Hoesch Rothe Erde (Thyssenkrupp Group, Germany), before SCHWING Stetter India.

Contribution to SCHWING Stetter India

• He set up the Marketing Department for SCHWING Stetter India from the Day 1 (1998).

• In 2007, he took charge of all Customer Facing Departments like Sales, Marketing, Service, Spares, Service Center, and Training.

• He was responsible for setting up the Export Business for SCHWING Stetter India and establishing the operation in South-East Asia, South Asia, East Africa and South Africa which currently contributes 10% Turnover of SCHWING Stetter India.

• He brought in Change Management and invested in Salesforce.com, PMS System and S&OP process to increase the efficiency of the Company.

• He established Social Media Marketing (Facebook, Pinterest, Twitter, Linked-In, You Tube, Instagram and Google Plus) and increased visibility for the Company. There more than 1,60,447 people follow on SCHWING Stetter Facebook Page.

• He was responsible to increase the Brand Value of SCHWING Stetter India by engaging Trade Magazines, Journals, and Newspapers and General Public Relationship and Corporate Communications.

• Overall SCHWING Stetter business continued to grow and in the last 3 years, it has grown 3 times.

• Since 2013, working towards establishing XCMG Brand in India.

• Under his leadership, Schwing Stetter India was awarded theApollo CV Award 2016 for Commercial Vehicle "Truck Application Builder" of the year for Concrete truck mixer and also in 2014.

• In 2015, it look lead in launching XCMG Group Products in India to create a non-concreting business group under SCHWING Stetter India Umbrella.

• In 2018, SCHWING Stetter become the No.1 business operation globally amongst SCHWING Group of Companies.

• In 2019 he assumed role of Managing Director of SCHWING Stetter (India) Private Limited.

Awards & Recognition

• He is the Convener of Membership Panel of Indian Construction Equipment Manufactures' Association (ICEMA)and also GC Member of ICEMA.

• He is theChairman of Mechanization Committee ofBuilders' Association of India (BAI).

• He played an active role in Confederation of Indian Industry (CII) and led two Business Delegations to Nepal and South Africa.

• Schwing Stetter India was awarded recently as "INFRASTRUCTUREICONS" from Shri Nitin Gadkariji, Honorable Cabinet Minister for Highways, Shipping and Ports organized by Navabharat Times Newspaper in its Infrastructure Conclave & Awards 2018 held on 24th August 2018 in Mumbai.

• Schwing Stetter India was awarded in December 2019 under the Winner Category ''Best Innovative Design– Digital Platform Award of the Year" (for Product – Developed an Online dashboard & implemented AI for analyzing the machine data).

• Schwing Stetter India was awarded two awards under the Winner Category "Best Company in Piling Equipment and Best Company in Concrete Construction Equipment" organized by CIA World, EPIC Media Private Ltd. in its Builders and Building Materials Award 2020 held on 29th February 2020 in Mumbai.

• Mr.V.G. Sakthi Kumar has been awarded the `Equipment India Person of the Year 2020'. The Award was presented by "Equipment India" Magazine at 8th Annual Equipment India Annual Awards held on 15th October 2020, 5.00 pm onwards virtually. The award was also part of the INDIA CONSTRUCTION FESTIVAL held virtually on 15th-16th October 2020.

• Under his leadership, the company has been recognized as one of the top ten Brands (Sixth Place) in the Construction & Concreting equipment Business group in the year 2021 on a survey among the top professionals of companies in the industry.

• During the pandemic , Mr.V G Shakthi Kumar had opened a COVID CARE Center inside the Factory premises, which was one of kind in the industry.

• He did not allow the expansion programme of Schwing Stetter India to behampered due to Covid. He had Inaugurated the Global manufacturing hub in Cheyyar in Feb'2021 amidst the Pandemic.

14.09.2021 அன்று சொசைட்டியின் 38வது மகாசபைக்கூட்டம் நடைபெற்றது

15.09.2021 அன்று தென்னக மய்யத்தின் 71வது மகாசபைக்கூட்டம் நடைபெற்றது

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02.09.2021 அன்று சென்னையில் நடைபெற்ற பத்திரிக்கையாளர் சந்திப்பு

19.09.2021 அன்று திருவள்ளூர் மய்யத்தின் சார்பில் நடைபெற்ற இலவச மருத்துவமுகாம்.

செயற்குழு உறுப்பினர் திரு. B. தனசேகர் அவர்களின் இல்லத்திருமண விழா

DISASTER-RESISTANT STRUCTURES

A.R.Santhakumar
Former Emeritus Professor,
Department of Civil
Engineering IIT Madras

In the past earthquakes and cyclones, most losses of life have occurred due to the collapse of buildings constructed with traditional materials such as stone, brick, and wood, which were not particularly engineered to be earthquake and cyclone resistant. Certain districts of India have been identified by the Vulnerability Atlas of India as well as the National Building Code (NBC 2005) of India as prone to multi-hazards, which include severe cyclones, moderate earthquakes, tidal waves in coastal regions, severe corrosion environment, and man-made disasters such as fire and blasts. In view of the continued use of such buildings in our country due to the existing socio-economic situation, it is essential to introduce disaster-resistant features in their planning, design, and construction.

From the results of studies on the performance of buildings during past disasters, the following recommendations emerge.

(a) Certain building types such as earthen houses, random-rubble masonry, as well as brickwork in clay mud/mortar should be ruled out in severe disaster prone zones and coastal zones that are vulnerable to cyclones and tsunamis.

(b) Rich mortars involving cement and lime should be used in fired brick and/or coursed stone masonry.

(c) Adequate steel reinforcement should be introduced in the walls.

(d) Light roofs should be properly anchored.

A building must be designed and constructed in such a way that even in the event of a probable earthquake or cyclone in the region, the following criteria are satisfied.

(a) An ordinary building should not suffer total or partial collapse.

(b) It should not suffer any irreparable damage which would require demolishing and rebuilding.

(c) It may sustain damage that can be repaired quickly and the building put back to its usual service.

(d) The damage to an important building should be even less so that the functioning of the activities during the post-emergency period may continue unhampered and the community buildings may be used as temporary shelters for the affected people.

The present state of knowledge indicates that the above-mentioned structural safety can be achieved by adopting appropriate design and construction details involving only a little extra expenditure.

The construction of houses for fishermen near coastal areas for resettlement is the primary objective of the rehabilitation effort after a coastal disaster. This is achieved by constructing houses with reinforced masonry, reinforced concrete, or steel frame buildings, and buildings using various types of structural systems. Traditional buidings which satisfy all the socio-economic needs should be made disaster resistant by using appropriate cost-effective technology. The choice of building material and construction technology should depend upon local conditions such as the social living pattern, economic affordability and accessibility of site, wind speeds, yearly and daily temperature variations, and rainfall in the area. Industrial buildings and institutional structures are excluded from the purview of this philosophy, and these should be designed and built as per IS code recommendations.

Thus the objective of this chapter is to highlight the basic concepts involved in achieving appropriate resistance to the multi-hazards endangering such buildings. The chapter includes the data for preparing technical details such as reinforcement details, planning aspects, quality control, and inspection necessary for achieving the desired long-term performance of the settlement. The structural components of the various types of building considered include the following:

- isolated strip footing or pile foundation
- load-bearing walls for single-storey buildings
- framed construction for more than two storeys.
- flat roofing for all types of buildings
- In order to make the structure cost effective, certain proven cost-effective technologies are used.

The chapter includes the following appendices.

Appendix 26.1: Categories of earthquake damages

Appendix 26.2: Building categories for various multi-hazard resisting features

Appendix 26.3: Information on and classification of coastal regulation zones

Appendix 26.4: MSK intensity scale

Appendix 26.5: Design procedure for wind resistance in buildings

Appendix 26.6: Basic design guidelines for CSEB

Appendix 26.7: List of IS codes published by Bureau of Indian Standards in the area of disaster-resistant construction

26.1 Disasters and Their Effects

Many parts of the world are affected by natural disasters such as earthquakes and severe cyclones and man-made catastrophes such as bomb blasts. Such catastrophes not only result in the structural damage or collapse, but also can prove to be detrimental to the life and safety of the occupants of the structure. Therefore, the effects of such disasters should be considered while constructing buildings.

26.1.1 Earthquakes

Earthquake damages depend on many parameters, including intensity, duration, and frequency of ground motion, geologic and soil condition, quality of construction, etc. Building design must be such as to ensure that the building has adequate strength, high ductility, and will remain as an integral unit even when subjected to very large deformation.

An observation of the structural performance of buildings during an earthquake can clearly identify the strong and weak aspects of the design, the desirable qualities of materials and techniques required for construction, and the criteria to be used for site selection. The study of the damage, therefore, provides an important step in the evolution of strengthening measures for different types of buildings.

The following are the basic causes of building damages during earthquake:

- Ground shaking
- Ground failure
- Tsunamis and tidal waves
- Fire

Appendix 26.1 lists the categories of earthquake damages. According to the extent of damage, the post-disaster actions to be taken for various damage categories are also suggested in this appendix.

Ground shaking

The principal cause of earthquake-induced damage is ground shaking. As the earth vibrates, all the buildings on the earth's surface respond to the vibration with varying degrees. Earthquake-induced acceleration, velocities, and displacements can severely damage or destroy a building unless it has been designed and constructed or strengthened to be earthquake resistant. Therefore, the effect of ground shaking on a building is a principal area of consideration in the design of earthquake-resistant buildings. The seismic loads are extremely difficult to determine because of the random nature of earthquake motions. However, experiences from past earthquakes have shown that reasonable and prudent practices can prevent a building from collapsing during an earthquake.

Effect of ground shaking on structures

Inertia force Buildings are fixed to the ground as shown in Fig. 26.1(a). As the base of the building moves, the superstructure along with its contents tends to shake and vibrate from the position of rest in a very irregular manner due to the inertia of the masses. When the base of the building suddenly moves to the right, the building moves to the left relative to the base [Fig.26.1(b)], as if it was being pushed to the left by an unseen force which we call inertia force. Actually there is no push at all, but because of its mass, the building resists any motion. The process is much more complex because the ground moves simultaneously in three mutually perpendicular directions during an earthquake as shown in Figs 26.1(b)-(d).

Seismic load The resultant internal force or seismic load is represented by force F as shown in Fig. 26.1(e). Force F is distinctly different from the dead, live, snow, wind, and impact loads. The horizontal ground motion action is similar to the effect of horizontal force acting on the building; hence the term 'seismic load'. As the base of the building moves in an extremely complicated manner, inertia forces are created throughout the mass of the building and its contents. It is these reversible forces that cause the building to move and sustain damage or collapse.

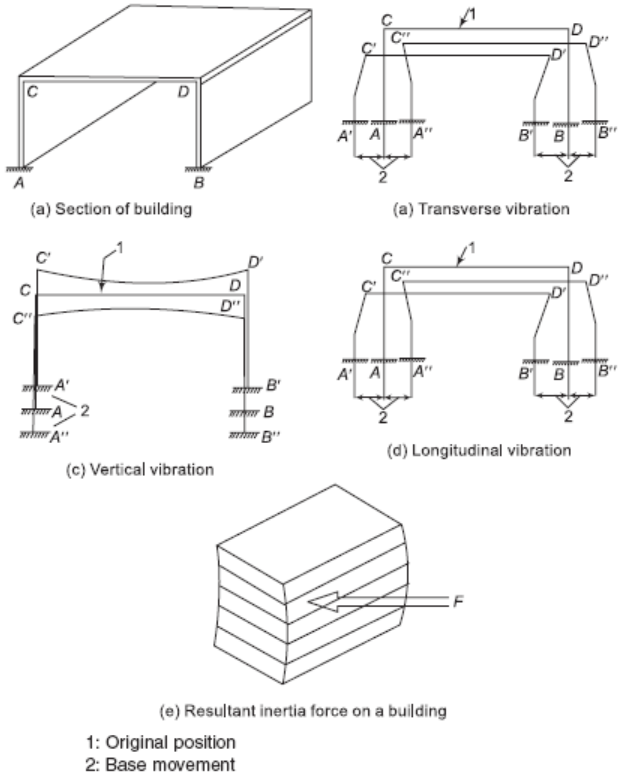


Fig. 26.1 Seismic vibration of a building and the resultant earthquake force (Source: ISET 1989)

Additional vertical load effect is caused on the beams and columns due to vertical vibrations. Being reversible, at certain instants of time, the effective load is increased. The stress condition in a typical wall element before and during an earthquake is shown in Fig. 26.2.

Earthquake loads are dynamic and impossible to predict precisely in advance, since every earthquake exhibits different characteristics. The following equivalent minimum total lateral force is used for seismic design as per IS: 1893-2002.

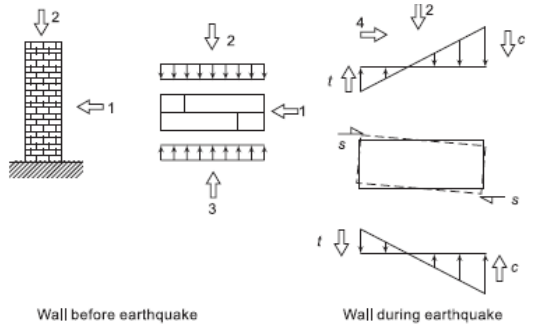


Fig. 26.2 Stress condition in a wall element

The horizontal seismic coefficient Ah for a structure can be determined by the following expression:

where VB is the design seismic base shear. Z is the earthquake zone factor, which depends upon the ground intensity of the earthquake. The value of Z is usually plotted on maps in terms of seismic intensity isolines or maximum acceleration isolines. Obviously, the higher the intensity or acceleration, the larger the seismic force. I is the occupancy importance or hazard factor, which depends upon the usage of the building. The greater the importance or larger the hazard caused by the failure of the building, the greater the value of the factor I. R is the response reduction factor, which depends on the ductility of the structure. If the structure is built with greater detailing to resist an earthquake, this factor is higher compared to that for an ordinarily built frame. (Sa/g) is a factor that depends on the natural period of vibration of the structure and the site on which the structure stands. W is the total weight of the superstructure of a building including its contents.

The inertia forces are proportional to the mass of the building, and only that part of the loading action that possesses mass will give rise to seismic force on the building. Therefore, the lighter the material, the lower will be the inertia force and hence good the smaller the seismic force.

Earthquake-induced inertia force can be distributed to the vertical structural elements in proportion to their stiffness, provided the roofs and floors are rigid to act as horizontal diaphragms. Otherwise, the roof and floor inertia will only get transferred to the vertical elements on which they are supported. Therefore, the stiffness and integrity of roofs and floors are important for good earthquake resistance.

The roofs and floors which are rigid, flat, and are bonded or tied to the masonry have a positive effect on the wall, such as the slab or slab and beam construction directly cast over the walls. Others that simply rest on the masonry walls will offer resistance to relative motion only through friction, which may or may not be adequate depending on the earthquake intensity. In the case of floors consisting of timber joints placed at a centre-to-centre spacing of 20–25 cm with brick tiles placed directly over the joists and covered with clayey earth, the brick tiles have no binding effect on the joists. Therefore, relative displacement of the joists is quite likely to occur during an earthquake, which could easily bring down the tiles, damaging property and causing injury to people. Similar behaviour may be visualized with the floor consisting of precast reinforced concrete elements not adequately tied together. In this case, the relative displacement of the supporting walls could bring down the slabs

Ground failure

Earthquake-induced ground failure has been observed in the form of ground ruptures along the fault zone, landslides, settlements, and soil liquefaction.

Ground rupture along a fault zone may be very limited or may extend over hundreds of kilometres. Ground displacement along the fault may be horizontal, vertical, or both, and can be in centimetres or metres. While a landslide can destroy a building, settlement can only damage it.

Soil liquefaction can occur in low-density saturated sands of relatively uniform size. The phenomenon of liquefaction is particularly important for dams, bridges, underground pipelines, and buildings standing on loose sandy soils.

Tsunami and tidal waves

A sudden movement of the ocean floor generally produces tsunamis or seismic sea waves. As the water waves approach land, their velocity decreases and their height increases from 5 to 8 m or even more. Obviously, tsunamis can be devastating for buildings in coastal areas. Tidal waves are caused by the effect of planets on the sea level. Tidal waves can cause flooding and damage buildings in the coastal zone.

Fire

A strong earthquake is accompanied by the disruption of water supply and fire due to electric short circuits. Therefore, the damage caused by an earthquake increases with earthquake-induced fire in addition to the direct damage to buildings. Thatch houses are extremely vulnerable to fire. When a fire starts, it becomes difficult to extinguish it, which leads to considerable loss of property and life.

26.1.2 Cyclones

The coastal areas of southern peninsular India have experienced a number of cyclonic windstorms, causing devastation over a large area due to

(a) high wind velocity, which destroys traditional houses and uproots trees and electric line supports,

(b) local floods caused by heavy rains, and

(c) storm surge waters, first flowing towards the land and then receding back, drowning people and destroying homes, agriculture, trees, and whatever comes in the path of the flowing water.

High-speed windstorms over the mainland also often cause severe damage to buildings, particularly to the lightweight roofs, free-standing walls, etc. Agricultural fields at the seacoast and inland suffer badly under high-speed winds.

The main destruction during cyclones occurs in the traditional non-engineered buildings built using local clay, brick, stones, adobe, or agro-based building materials. Engineered buildings which have high-pitched roofs also suffer damage unless appropriate precautions are taken in design as well as during construction. Even in heavy constructions, substantial non-structural damages occur to doors, windows, cladding wall panels, glass, panes, etc.

The macro-level wind speed zones of India have been formulated and published in IS: 875(3)-1987 titled Indian Standard Code of Practice for Design Loads (other than Earthquakes) for Buildings and Structures, Part 3, Wind Loads. There are six basic wind speeds V0 considered for zoning, namely, 55, 50, 47, 44, 39, and 33 m/s. From the wind speed viewpoint, these could be classified as follows:

55 m/s (198 km/h):	very high damage risk zone A
50 m/s (180 km/h):	very high damage risk zone B
47 m/s (169.2 km/h):	high damage risk zone
44 m/s (158.4 km/h):	moderate damage risk zone A
39 m/s (140.4 km/h):	moderate damage risk zone B
33 m/s (118.8 km/h):	low damage risk zone

Design wind speed and pressure

The magnitude of wind pressure depends on the

- aerodynamic flow of wind around the building
- windward vertical faces of the building
- leeward faces encountering suction effects
- slope of pitched roofs

The projected elements of a building such as window sunshades and eaves are subjected to uplift pressures several times the intensity of the horizontal wind pressure pz. These factors contribute significantly to the vulnerability of a building type in a given wind speed zone.

The design wind pressure at a height z above the ground level on a surface normal to the wind stream is given by pz = 0.0006 Vz2, where Vz is the design wind velocity (m/s) and pz is the design wind pressure (kN/m2), the basic wind speed being the same in a given zone.

Coastal areas

Coastal areas are subjected to severe windstorms and cyclonic storms. It is known that sometimes the wind gusts can appreciably exceed the specified basic wind speeds (by as much as 40% to 55%). However, for the design of structures (except those considered very important) the above-mentioned macro-level zoning is considered adequate.

The frequency of occurrences of cyclones on different portions of the east coast has been different. Even for the same design wind speed, the risk of damage per year will be higher in areas subjected to frequent cyclones. For important buildings in the coastal zone, the IS code recommends adoption of a separate cyclone enhancement factor.

Storm surge/tidal waves

Besides the very high velocity winds, coastal areas suffer from the onslaught of seawater over the coast due to the storm surge generated by cyclones. A storm surge is the sudden abnormal rise in sea level caused by a cyclone. The surge is generated due to the interaction of air, sea, and land. The seawater flows across the coast as well as inland and then recedes back to the sea. Huge loss of life and property takes place in the process. The extent of storm surge is greater during high tides.

Types of damage during cyclones

The wind pressures and suction effects on flat objects could be sufficient enough to lift them off and carry them away from their place of rest unless adequately tied down to firm supports. This is due to the aerofoil effects of structural shapes and the magnitude of cyclonic windstorms. Table 26.1 summarizes the effects of windstorms and aerofoil effects.

Table 26.1 Aerofoil effects of windstorms

Wind speed (m/s)	Typical possible movement
30–35	Roof sheets fixed to purlins fly
35–40	Small aircrafts take off automatically (if not held down)
40–45	Roof tiles nailed to battens fly
45–50	Garden walls blow over and fall
50–55	Un-reinforced brick walls fail
55–60	Major damage is caused by flying debris
60–65	70-mm-thick concrete slabs fly

The resistance required to be provided for multi-hazards depends on the category of the building as specified in Appendix 26.2.

26.2 Construction and Planning Aspects for Resistance Against Disasters

To resist disasters, appropriate strengthening and resistive features need to be incorporated into the design and construction of vulnerable structures. This section elaborates on the various construction and planning aspects of disaster resistance.

26.2.1 Site/Soil Particulars

Site selection

The choice of site for a building, from the failure prevention point of view, is mainly concerned with the stability of the ground. Very loose sands or sensitive clays are liable to be destroyed by earthquakes, as they tend to lose their original structure and thereby undergo compaction. This results in large unequal settlements and damages the building. If these loose, cohesionless soils are saturated with water, they are likely to lose their shear resistance altogether during ground shaking. This leads to liquefaction.

Although such soils can be compacted, the operation may be too costly for small buildings and sites having such soils are better avoided. For large building complexes, such as housing developments, residential colonies, etc., this option should be thoroughly investigated and the site selected appropriately.

Therefore a site with sufficient bearing capacity and free from the above defects should be chosen and its drainage condition improved so that no water accumulates and saturates the ground especially close to the footing level.

Bearing capacity of foundation soil

We consider the bearing capacities of three soil types here.

- Firm—Soils that have an allowable bearing capacity of more than 10 t/m2
- Soft—Soils that have an allowable bearing capacity of less than or equal to 10 t/m2
- Weak—Soils that are susceptible to large differential settlement or liquefaction during an earthquake

Buildings can be constructed on firm and stiff soils, but it is dangerous to build on weak soils. Hence, appropriate soil investigation should be carried out to establish the allowable bearing capacity and nature of the soil. Weak soils must either be avoided or compacted to improve them so as to qualify them as either firm or stiff.

26.2.2 Foundations

For the purpose of rendering a building truly disaster resistant, it will be necessary to choose an appropriate foundation type. Since loads from typical low height buildings will be light, providing the required bearing area will not usually be a problem. For choosing the type of footing from the earthquake angle, the soils may be grouped as firm and soft, avoiding weak soils altogether.

Firm soil

In firm soil conditions, any type of footing (individual or strip type) can be used. It should of course have a firm base of lime or cement concrete with the requisite width, over which the construction of the footing can be started. It is advisable to connect the individual reinforced concrete column footings by means of RC beams just below the plinth level (plinth band).

Soft soil

In soft soil, it is advisable to use a plinth beam on all walls and wherever it is necessary to connect the individual column footings by means of ground beams as well. It may be mentioned that continuous reinforced concrete footings are considered to be the most effective from disaster resistance as well as storm surge resistance considerations. Such foundations also avoid differential settlements under normal vertical loads. Continuous footing should be reinforced both at the top and bottom faces, the width of the footing should be wide enough to make the contact pressures uniform, and the depth of the footing should be below the lowest level of possible scour.

Selection of foundation type

Certain types of foundations are more susceptible to damage than others. Isolated footings of columns are likely to be subjected to differential settlement particularly where the supporting ground consists of a soft type of soil. Mixed types of foundations within the same building may also lead to damage due to differential settlement. Table 26.2 suggests various descriptions of shallow and deep foundations adopted.

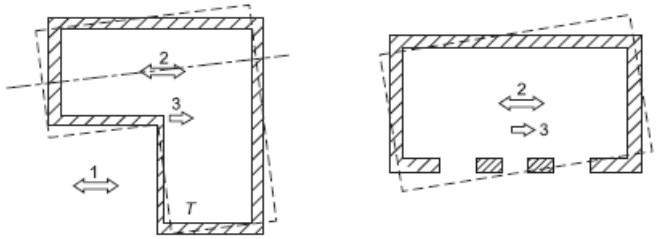
Table 26.2 Types of foundations

Type	Description
Shallow foundation	Wall or column embedded in soil, without footing (to be avoided)
	Rubble stone (field stone) isolated footing
	Rubble stone (field stone) strip footing
	Reinforced concrete isolated footing
	Reinforced concrete strip footing
	Mat foundation
Deep foundation	Reinforced-concrete-bearing piles
	Reinforced concrete skin friction piles
	Steel-bearing piles
	Wood piles
	Steel skin friction piles
	Cast-in-place concrete piers
	Caissons

26.2.3 Building Plan

Symmetry

The building as a whole or its various blocks should be kept symmetrical about both the axes. Asymmetry leads to torsion during earthquakes and is dangerous. Torsion due to asymmetric bending is shown in Fig. 26.3. Symmetry is also desirable in the placing and sizing of door and window openings as far as possible.



1: Earthquake force
2: Centre of stiffness or resistance force
3: Centre of gravity or the applied inertia force
T: Twisted building

Fig. 26.3 Torsion of asymmetrical building

Regularity

Simple rectangular shapes [Fig. 26.4(a)] behave better during an earthquake than shapes with projections [Fig. 26.4(b)]. The torsional effects of ground motion are pronounced in long narrow rectangular blocks. Therefore it is desirable to restrict the length of a block to two times its width. If longer lengths are required, two separate blocks with sufficient separation in between should be used [Fig. 26.4(c)].

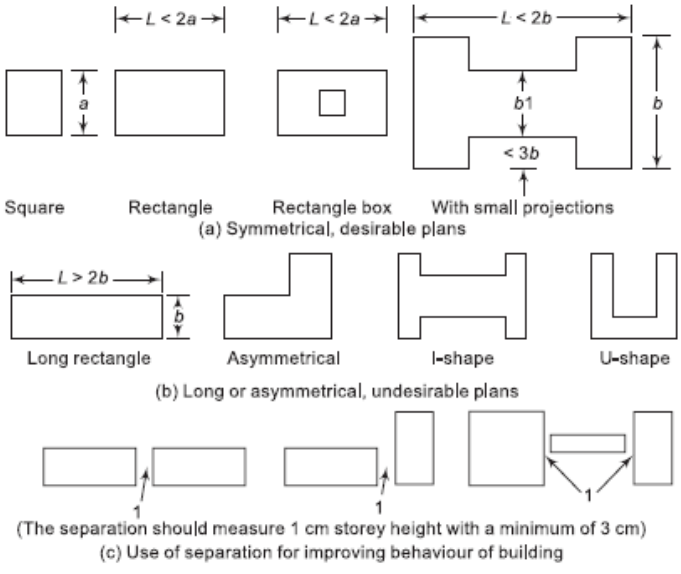


Fig. 26.4 Plan of building blocks

Enclosed areas

A small building enclosure with properly interconnected walls acts like a rigid box. The strength of the long walls is derived from the transverse walls. Therefore, structurally, it is advisable to have separately enclosed rooms, Fig. 26.5(a), rather than one long room, Fig. 26.5(b). For an unframed wall of thickness t and wall spacing a, the ratio of a/t = 40 should be the upper limit for masonry cross walls made with mortars of cement–sand ratio 1:6 or richer and less for poorer mortars. For larger panels or thinner walls, RC framing elements should be introduced as shown at Fig. 26.5(c).

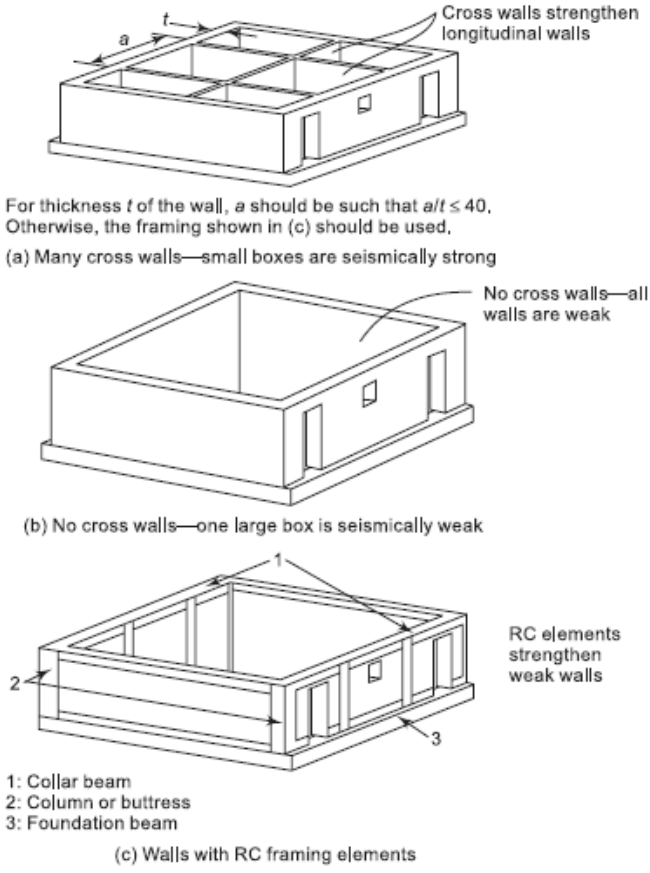


Fig. 26.5 Enclosed area forming box units

Regulations on gaps between buildings

Separation of a large building into several blocks may be required to obtain the symmetry and regularity of each block. For preventing hammering or pounding damage between blocks, a physical separation of 3 to 4 cm throughout the height above the plinth level will be adequate as well as practical for buildings of up to three storeys height.

Simplicity

Ornamentation involving large cornices, vertical or horizontal cantilever projections, facia stones and the like are dangerous and undesirable from the disaster resistance viewpoint. Simplicity is the best approach. Where ornamentation is insisted upon, it must be reinforced with steel, which should be properly embedded or tied into the main frame of the building.

Separate buildings for different functions

In view of the difference in importance of hospitals, schools, assembly halls, residences, communication and security buildings, etc., it may be economical to plan separate blocks for different functions so as to economize strengthening costs.

26.2.4 Buildings with Fired Brick Masonry Units

Masonry walls are brittle and fail during disasters. Herein we discuss the causes of failure of masonry units and their strength and reinforcement requirements in wall constructions to avoid sudden failure.

Causes of failure

Load-bearing walls must be built either with rectangular blocks or with stone masonry in cement–sand mortar. The following are the main weaknesses of unreinforced masonry constructions, which lead to extensive damage during disasters.

(a) Heavyweight and very stiff buildings, attracting large seismic inertia forces.

(b) Very low tensile strength, particularly with poor mortars.

(c) Low shear strength, particularly with poor mortars.

(d) Brittle behaviour in tension as well as in compression.

(e) Weak connection between the longitudinal and transverse walls

(f) Weak connection between the roof and walls

(g) Stress concentration at the corners of windows and doors.

(h) Overall asymmetry in the plan and elevation of the building.

(i) Asymmetry due to imbalance in the sizes and positions of the openings in the walls.

(j) Defects in construction such as the use of substandard materials, unfilled joints between bricks, out of plumb walls, and improper bonding between walls at right angles.

Typical strengths of masonry

The crushing strength of masonry used in walls depends on many factors, such as the following.

(a) Crushing strength of the masonry unit, namely, the brick.

(b) Mix of the mortar used and age of testing. The mortar used for different wall constructions varies in quality as well as strength. It is generally described on the basis of the main building material such as cement or lime mortar, cement lime composite mortar, lime-pozzolana, or hydraulic lime mortar. Clay mud mortar is also used in rural areas.

(c) The slenderness ratio of the wall, that is, the smaller of the ratio of effective height and effective length of the wall to its thickness. The larger the slenderness ratio, the smaller the strength.

(d) Eccentricity of the vertical load on the wall—the larger the eccentricity, the smaller the strength.

(e) Percentage of openings in the wall—the larger the openings, the smaller the strength. The tensile and shearing strengths of masonry mainly depend upon the type of bond such as either English or rat trap bond. (The masonry bonds are discussed later in this section.)

Adhesion at the contact between the masonry unit and the mortar is only a small percentage of the crushing strength. The richer the mortar in the cement or lime content, the higher the percentage of tensile and shearing strength in relation to the crushing strength. Tests carried out on brick couplets using handmade bricks in cement mortar give the compressive strength values shown in Table 26.3.

Table 26.3 Typical strengths of masonry

Mortar mix		Tensile strength (MPa)	Shearing strength (MPa)	Compressive strength corresponding to the crushing strength of the masonry unit (MPa)			
Cement	Sand			3.5	7.0	10.5	14.0
1	12	0.04	0.22	1.5	2.4	3.3	3.9
1	6	0.25	0.39	2.1	3.3	5.1	6.0
1	3	0.71	1.04	2.4	4.2	6.3	7.5

The modulus of elasticity of masonry very much depends upon the density and stiffness of the masonry unit, besides the mortar mix. For brickwork, the values are of the order of 2000 MPa for cement–sand mortar in 1:6 proportion. The mass density of masonry mainly depends on the type of masonry unit. For example, brickwork will have a mass density of about 19 kN/m3 and dressed stone masonry 24 kN/m3.

Mortar

Since tensile and shear strength are important for the seismic resistance of masonry walls, the use of mud or very lean mortars is unsuitable. A mortar mix of cement and sand in a 1:6 ratio by volume or equivalent is recommended.

Appropriate mixes for various categories of construction are recommended in Table 26.4. The use of a rich mortar in narrow piers between openings will be desirable even if a lean mix is used for the walls in general.

Table 26.4 Recommended mortar mixes

Category of construction*	Proportion of cement–lime–sand
I	Cement–sand 1:4 or cement–lime–sand 1:1:6 or richer
II	Cement–lime–sand 1:2:9 or richer
III	Cement–sand 1:6 or richer
IV	Cement–sand 1:6 or lime–surki 1:3 or richer

*The category of construction is defined in Appendix 26.2.

Wall enclosures

In load-bearing wall constructions, the wall thickness t should not be less than 190 mm, the wall height not more than 20t, and the wall length between cross-walls not more than 40t. If longer rooms are required, either the wall thickness should be increased or buttresses of full height should be provided at 20t or less apart. The minimum dimensions of the buttress should be equal to the thickness, the top width equal to t, and the bottom width equal to one-sixth the wall height.

Openings in walls

Studies carried out on the effect of openings on the strength of walls indicate that they should be small in size and centrally located. The following are guidelines on the size and position of openings (Fig. 26.6).

(a) Openings should be located away from the inside corner by a clear distance b5 equal to at least one-fourth the height of the openings but not less than 60 cm.

(b) The total length of the openings ($b_1 + b_2 + b_3$) should not exceed 50% of the length (L1) of the wall between consecutive cross walls in single-storey constructions, 42% in two-storey constructions, and 33% in three-storey buildings.

(c) The horizontal distance b_4 (pier width) between the two openings should be greater than half the height of the shorter opening but not less than 60 cm.

(d) The vertical distance from an opening to an opening directly above it, h_3, should not be less than 60 cm nor less than half the width of the smaller opening.

(e) When the openings do not comply with the requirements mentioned above, they should either be boxed in reinforced concrete or provided with reinforcing bars at the jambs through the masonry (Fig. 26.7).

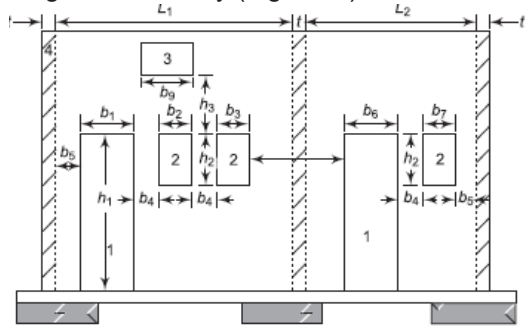


Fig. 26.6 Recommendations regarding openings in load-bearing wall

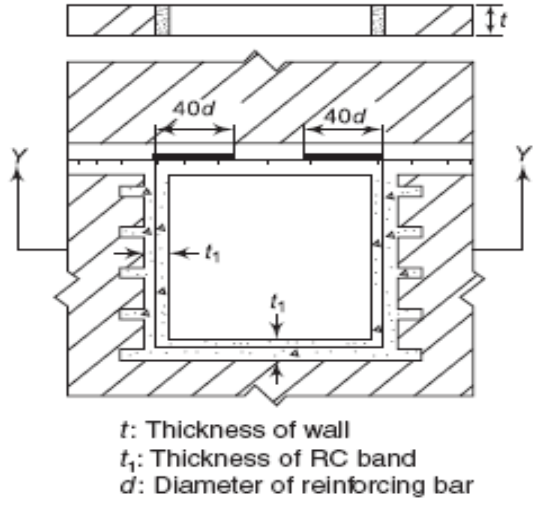
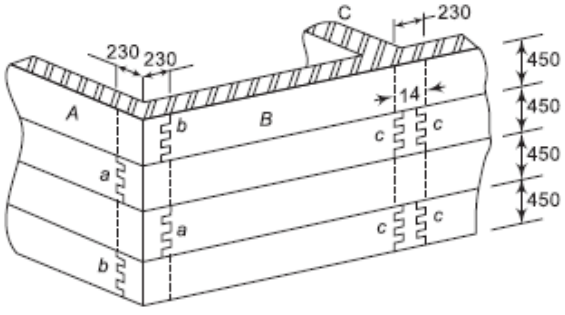


Fig. 26.7 Strengthening masonry around opening (window)

Masonry bonds

For achieving the full strength of masonry, the usual bonds specified for masonry should be followed so that the vertical joints are broken properly from course to course.

For convenience of constructions, builders prefer to make toothed joints (Fig. 26.8), which are often left hollow and weak. To obtain a full bond it is necessary to make a slopping (stepped) joint by first constructing the corners up to a height of 600 mm and then building the wall in between them. Otherwise the toothed joints should be made in both the walls alternately in lifts of about 45 cm.



a, b, c: Toothed joints in the walls

Fig. 26.8 A typical detail of masonry

Horizontal reinforcement in walls

Horizontal reinforcement is required in walls for imparting to them horizontal bending strength against plate action for out-of-plane inertia load and for tying the perpendicular walls together. In the partition wall, horizontal reinforcement helps preventing shrinkage and temperature cracks. The following reinforcing arrangements are necessary.

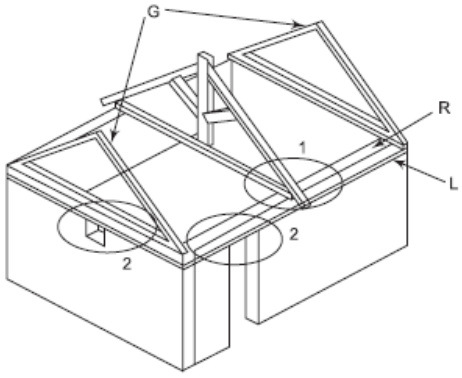
Horizontal bands or ring beams Reinforced concrete bands are provided continuously through all load-bearing longitudinal and transverse walls at plinth, lintel, and roof-eave levels, also at the top of gables according to the requirements stated below.

Plinth band This should be provided to resist lateral loads and avoid differential settlement in weak foundation soils. It also serves as a damp-proof course.

Lintel band This is the most important band and incorporates in itself all door and window lintels. The reinforcement required for lintel for bridging door/window openings should be extra to the lintel band steel. It must be provided on all walls in a storey and in all storeys.

Roof band This band is required at the eave level of roofs and also below or in level with floors that consist of joists and covering elements so as to properly integrate them at the ends and fix them onto the walls.

Gable bands Masonry gabble ends must have the triangular portions of masonry enclosed in a band; the horizontal part must be continuous with the eave level band on longitudinal walls as shown in Fig. 26.9.



L: Lintel band—at the top of door/window opening
R: Roof band—at the roof level
G: Gable band
Note: If lintel and roof bands are close together they can be integrated and provided as a roof–lintel band.
1: As an alternative to gable masonry, a truss or open gable may be used and the opening covered with light material such as sheeting, mat, etc.
2: If the wall height up to eave level is less than or equal to 2.5 m, the lintel level band may be omitted and the lintels integrated with the eave level band.

Fig. 26.9 Gable band, roof band, and lintel band in a building

Selection of bands or ring beams

The reinforcement and dimensions of these bands may be kept as follows for wall spans up to 9 m between the cross walls or buttresses.

A band consists of two (or four) longitudinal steel bars with links or stirrups embedded in 75-mm (or 150-mm) -thick concrete (Fig. 26.10). The thickness of the band may be made equal to or a multiple of masonry units and its width should equal the thickness of the wall. The steel bars are located close to the wall faces with 25-mm cover and full continuity is provided at the corners and junctions. The minimum size of a band and the amount of reinforcement required depend upon the unsupported length of the wall between cross walls and the effective seismic coefficient based on the seismic zone, importance of buildings, and type of soil and wind zone as defined by the building category (see Appendix 26.2). For longer spans, the size of the band must be specially designed.

Table 26.5 Recommendation for steel in RC band

Span (m)	Category I		Category II		Category III		Category IV	
	No. of bars	Dia. of bars (mm)	No. of bars	Dia. of bars (mm)	No. of bars	Dia. of bars (mm)	No. of bars	Dia. of bars (mm)
5	2	12	2	10	2	10	2	10
6	2	16	2	12	2	10	2	10
7	2	16	2	16	2	12	2	10
8	4	12	2	16	2	16	2	12
9	4	16	4	12	2	16	2	12

Notes:

1. The width of the RC band is assumed to be the same as the thickness of wall. The wall thickness should be 20 cm minimum. A cover of 25 mm should be maintained from the face of the wall. For thicker walls, the quantity of steel need not be increased.

2. The vertical thickness of the RC band may be kept as low as 75 mm where two longitudinal bars are specified and 150 mm where four longitudinal bars are specified.

3. The concrete mix should be 1:1.5:3 by volume or have 20 MPa cube crushing strength at 28 days. The w/c ratio should be less than 0.4. In coastal areas, a richer mix having 30 MPa should be used.

4. The longitudinal bars should be held in position by steel links or stirrups 6 mm in diameter spaced 150 mm apart.

The appropriate steel and concrete sizes for various buildings are recommended in Table 26.5. The bands must be located at critical levels of the building, namely, the plinth, lintel, roof, and gables according to requirements (Fig. 26.10).

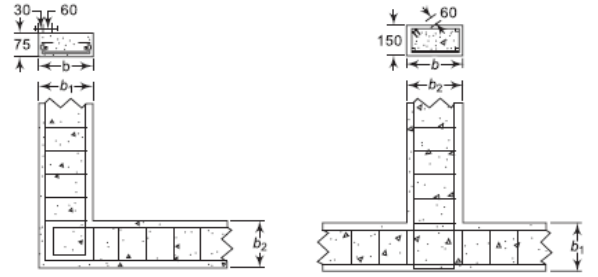
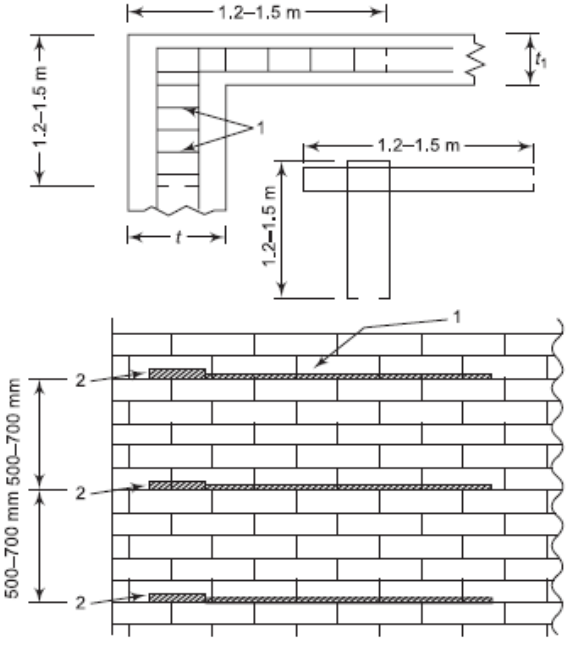


Fig. 26.10 Reinforcement detail in RC band

Dowels at corners and junctions

As a supplement to the bands described above, steel dowel bars may be used at corners and T-junctions to integrate and create the box action of walls. Dowels (Fig. 26.11) are placed in every fourth course or at about 50 cm intervals and taken into the walls up to sufficient length so as to provide the full bond strength. Wooden dowels can also be used instead of steel. However, the dowels do not serve to reinforce the walls in horizontal bending except near the junctions. It is preferable to embed the dowel reinforcements in concrete of at least 40 mm cover to protect them against corrosion.



t, t_1: Wall thickness
1: Cross links
2: Thicker joints to receive two layers of bars

Fig. 26.11 Corner strengthening by dowel reinforcement

Vertical reinforcement in walls

The critical sections of walls are the jambs of the openings and the corners of walls. The amount of vertical reinforcing steel required at these critical sections depends upon several factors, such as the number of storeys, storey heights, the effective seismic force based on the seismic zone, the importance of the building, and the soil foundation type. Values of diameters of steel bars to be provided at these critical sections based on rough estimates for buildings are given in Table 26.6 for ready use. The steel bars must be installed at the critical sections, that is, the corners of walls and jambs of doors, starting right from the foundation concrete, and the cavities made around them during the masonry construction must be covered with cement concrete. This concrete mix should be kept at 2:3:6 by volume or richer (w/c ratio to be less than 0.4). Typical arrangements of vertical steel in brickwork are shown in Fig. 26.12. In coastal areas, concrete of grade M30 must be used for protecting the steel against corrosion.

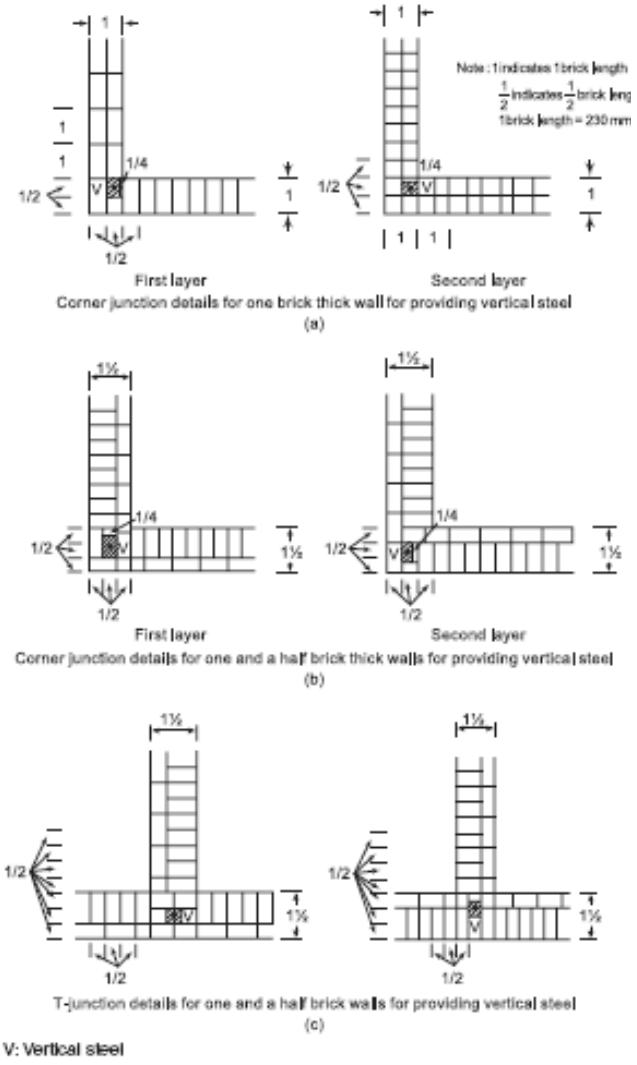


Fig. 26.12 Vertical reinforcement provision details in walls

Table 26.6 Diameters of steel bars to be provided at critical sections

Number of storeys	Storey	Diameter of steel bar at each critical section for the respective category* (mm)			
		Category I	Category II	Category III	Category IV
One		16	12	12	Nil
Two	Top	16	12	12	Nil
	Bottom	20	16	16	Nil
Three	Top	16	12	12	Nil
	Middle	20	16	12	Nil
	Bottom	20	16	16	Nil
Four	Top				
	Third	†	†	12	12
	Second			16	12
	Bottom			16	12

*The categories of construction are defined in Appendix 26.2.
†Four-storied load-bearing wall constructions should not be used for category I and II buildings.

It is easiest to provide the jamb steel of window openings in box form around them. The vertical steel of the openings may be terminated by embedding it into the lintel band but the vertical steel at the corners and junctions of the walls must be taken into the floor or the roof slabs or into the roof band (Fig. 26.13).

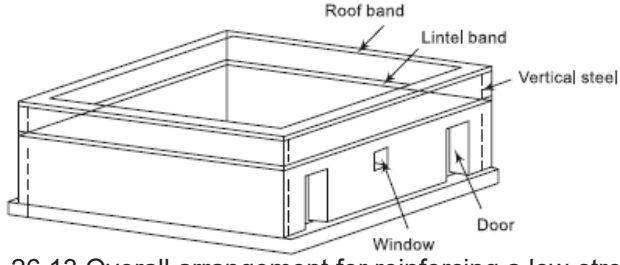


Fig. 26.13 Overall arrangement for reinforcing a low-strength masonry building

26.2.5 Buildings with Cost-effective Masonry Units

Hollow block masonry

The following details may be used for placing horizontal and vertical steel in hollow block masonry using cement–sand or cement–concrete blocks.

Horizontal reinforcement U-shaped blocks may be used for constructing horizontal bands at various storeys as per seismic requirements as shown in Fig. 26.14. The amount of horizontal reinforcement used may be 25% more than that given in Table 26.5 and provided by using four bars and 6-mm-diameter stirrups. The other details shown in Fig. 26.10 should be used.

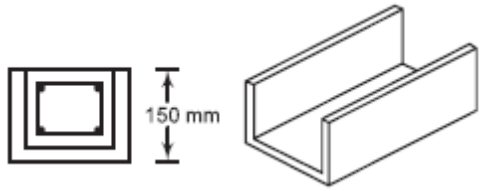


Fig. 26.14 U-block for horizontal bands

Vertical reinforcement The vertical bars specified in Table 26.6 may conveniently be located inside the cavities of a hollow block, one bar in one cavity. When more than one bar is planned, they should be placed in two or three consecutive cavities as shown in Fig. 26.15. Cavities having bars are filled with micro-concrete (2:3:6) or cement–sand mortar (1:3) and properly compacted.

Fig. 26.15 Vertical reinforcement in cavities for hollow block masonry

In practice threading the bars through the hollow block is difficult since they have to be set in footings, and have to be set vertically while lifting the blocks through entire storey heights, threading them into the cavities and lowering them down to the bedding level. To avoid lifting a block too high, the bars are made shorter and lapped adequately with the upper portion of the bars.

Compressed stabilized earth block masonry

Earth (that is, soil) is a locally available material. It can be stabilized with cement. The interlocking keys of a typical block (Appendix 26.6; Fig. A26.1) increase the strength of the wall against lateral forces. The interlocking blocks can be suitably reinforced through the hole provided for disaster resistance.

Compressed stabilized earth block (CSEB) technology can be effectively used based on the details given in Appendix 26.6. However, when this technology is used for ensuring adequate quality, blocks have to be tested and a record has to be kept with respect to strength under wet and dry conditions.

Other cost-effective techniques such as rat-trap bond masonry, can also be used, provided the disaster resistance features are incorporated in them.

26.2.6 Construction Details for Buildings with Stone Masonry

Stone masonry construction

Stone buildings using fully dressed rectangular stone units or cast solid blocks consisting of large stone pieces in a cement mix 1:3:6 (cement:sand:large stone pieces) may be built.

Typical damage and failure of stone buildings

Random-rubble and half-dressed stone buildings (Fig. 26.16) have suffered extensive damage and complete collapse during past earthquakes and other disasters. The following are the main ways in which such buildings have been observed to be damaged.

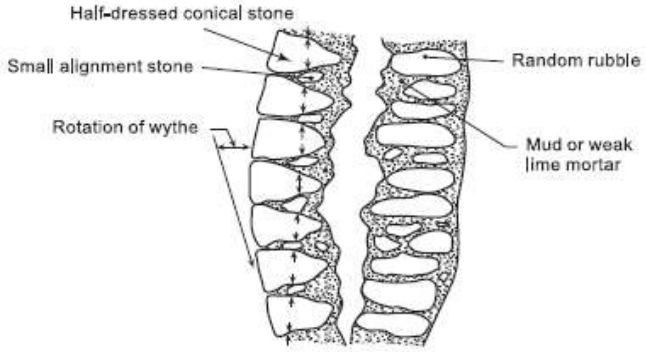


Fig. 26.16 Wall delaminated with buckled wythe (Source: ISET 1989)

• Separation of walls at corners and T-junctions, which takes place more easily than in brick buildings due to poor connections between the walls.

• Delamination and bulging of walls, that is, vertical separation of internal wythe and external wythe through the middle of wall thickness. This occurs mainly due to the absence of 'through' or bond stones and weak mortar filling between the wythes. In half-dressed stone masonry, the surface stones are pyramidal in shape having more or less an edge contact one over the other. Thus the stones are in an unstable equilibrium and get easily disturbed under minor shaking of the ground.

Crumbling and collapsing of bulged wythes after delamination under the heavy weight of roofs/floors, leading to the collapse of the roof along with the walls or causing large gaps in walls, are common occurrences during earthquakes.

Outward overturning of stone walls occurs after separation at corners due to the inertia of roofs and floors and their own inertia when the roofs are incapable of acting as horizontal diaphragms. This particularly happens when the roof is flexible and consists of round poles, reed matting, and clay covering.

Frequently, such stone houses are completely shattered and razed to the ground, the walls being reduced to heaps of rubble. People living in such homes get buried under the rubble and more often killed. Thus, such buildings, without the structural improvements suggested below, are considered dangerous, particularly in seismic zone III or higher or during high tidal waves in coastal curves.

Typical structural properties

Test data on the strength characteristics of random-rubble and half-dressed stone masonry are not available. It is, however, qualitatively known that the compressive strength even with clay mud used as mortar is enough to support three storeys, but the tensile strength could only be close to zero. The sliding shear strength could only be due to frictional resistance.

General construction aspects

Overall dimensions

1. The height of the construction may be restricted to one storey for buildings of categories I and II and two storeys for categories III and IV. When light sheeted roof is used, an attic floor may also be provided. The height of a storey may be kept as low as 2.5 m.

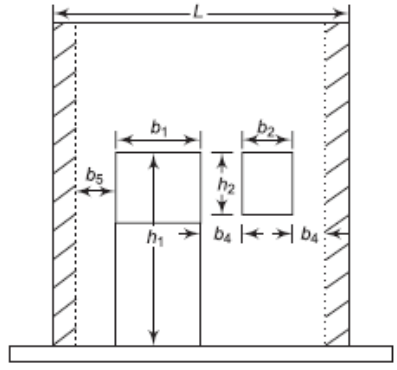
2. The wall thickness should be as small as feasible, say, 300– 450 mm.

3. The unsupported length of a wall between cross walls may be limited to 7 m.

4. For longer walls, buttresses may be used at intermediate points not farther apart than 3 m. The thickness or top width and the base width of a buttress may be kept as t and h/6, respectively, where t is the thickness and h is the actual height of the wall.

Mortar Clay mud mortar should be avoided. The mortars specified and recommended in Table 26.4 may be used for stone walls.

Openings in walls The openings in walls should be as small and as centrally located as practicable. The recommended opening limitations are shown in Fig. 26.17. Ventilators, where used, may be of size 450 × 450 mm or smaller.



$b_1 + b_2 < 0.3L$
$b_4 \geq 0.5h_2$ but not less than 600 mm
$b_5 \geq 0.25h_1$ but not less than 600 mm

Fig. 26.17 Recommended openings in bearing walls in rubble masonry (Source: ISET 1989)

Masonry bond Random-rubble masonry construction should be brought to courses at not more than 600 mm lift. Through stones of full length equal to the wall thickness should be used in every 600 mm lift not more than 1.2 m apart horizontally. If full-length stones are not available, stones in pairs, each of about three-fourth the wall thickness, may be used in place of one full-length stone to provide an overlap between them.

In place of through stones, bonding elements made of s-shaped or hooked link steel bars 8 to 10 mm in diameter may be used with a cover of 25 mm from each face of the wall (Fig. 26.18). Alternatively, wooden bars of 38 mm × 38 mm cross section or equivalent may be used instead of through stones. The wood used should be well preserved through seasoning and chemical treatment so as to be durable against weathering action and insect attack (Fig. 26.18).

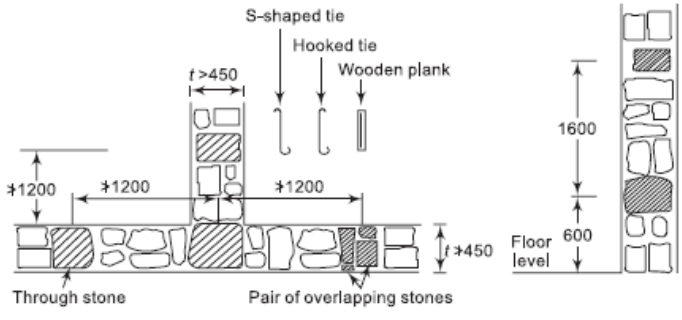


Fig. 26.18 Through stone and bond elements (Source: ISET 1989)

Bond stones should also be used at corners and junctions of walls to break the vertical joints and bond perpendicular walls.

Horizontal reinforcement for walls All the horizontal reinforcements recommended for brick buildings may be used for random-rubble constructions as well.

Vertical reinforcement for walls The amount of vertical steel required to be provided at the corners and T-junctions of stone masonry walls and at the jambs of the openings is given in Table 26.7 and depicted in Fig. 26.19.

Table 26.7 Recommended vertical steel at critical sections of masonry walls

Number. of Storeys	Diameter of bar at each critical section for various categories* (mm)		
	Category I	Category II	Category III
One	20	16	14
Two	†	†	16

*The categories of construction are defined in Appendix 26.2. An equivalent area of deformed bars or a number of mild steel bars could be used alternatively, but their diameter should not be less than 12 mm.

†Two-storeyed buildings with load-bearing stone masonry of the random-rubble or half-dressed stone type are not recommended for categories I and II.

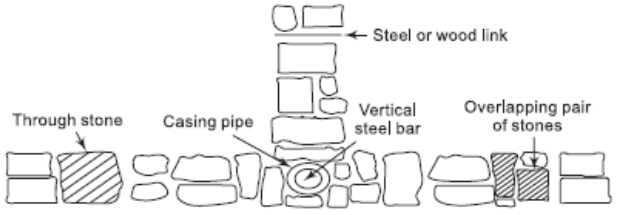


Fig. 26.19 Vertical steel reinforcement in low-strength masonry walls (typical construction details for installing vertical steel bars in random-rubble stone masonry)

Buildings of category IV need not incorporate vertical steel. For providing vertical bars in stone masonry, a casing pipe is recommended around which masonry is built to a height of every 600 mm.

The pipe is kept loose by rotating it during the masonry construction. Then the casting pipe is raised and the cavity below is filled with a 1:1.5:3 concrete mix and rodded to compact it. The concrete not only provides the bond between the bar and the masonry but is also intended to protect the bar from corrosion. In coastal areas care should be taken to use M30 grade concrete and restrict the w/c ratio strictly to 0.4.

The jamb steel may be taken from the footing up to the lintel band and anchored into it. The corner steel must be taken from the footing up to the roof slab or roof band and anchored into it similar to the anchorage shown in Fig. 26.13.

26.2.7 Buildings with reinforced cement concrete

With the spread of reinforced concrete construction to semi-urban and rural areas in India, buildings are often constructed using reinforced concrete columns and beams, without proper engineering design, based on the experience of local masons and small contractors. The use of isolated columns together with load-bearing walls for supporting long internal beams or those in verandahs and porches is becoming quite common. In most cases, such constructions suffer from deficiencies from the disaster resistance viewpoint, since no consideration is given to the effect of lateral loads, and the connection details are usually such that no moment carrying capacity due to lateral forces can be relied upon. Beams simply rest on top of columns and are mostly held in position by friction. The friction can be overcome by buoyancy or upward movements due to either winds or earthquakes or water uplift pressure due to tidal waves or tsunami.

The other serious deficiency lies in concrete quality in respect of mixing, placing, compacting, and curing. The aim of this section is to provide working guidelines for such low-rise (up to three storeys), small buildings in RC frame constructions, in which columns are supposed to resist vertical loads as well as horizontal forces and the filler walls are assumed to be neither load-bearing nor taking part in the lateral resistance of the building. Large halls for gymnasia, assembly halls, etc. having a floor area of more than 60 m2 or beam spans of more than 7 m must be designed and proof checked for adequacy as per the relevant IS standards.

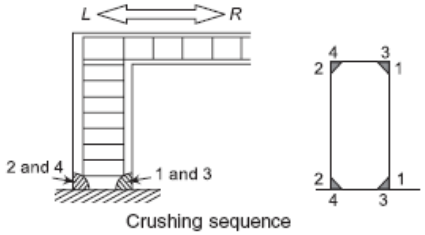
Typical damage and collapse of RC buildings

The following types of damage are quite common in reinforced concrete buildings.

Sliding of roofs off supports Beams that simply rest on walls or columns slide off them when the lateral load intensity exceeds the frictional resistance and often leave the support and fall down, particularly if the bearing length is inadequate.

Falling of infill walls The infill panel walls in between reinforced concrete columns overturn outside the framework if not held tight or connected properly with the frames.

Crushing of column ends and virtual hinging During severe shaking, the column ends are subjected to heavy eccentric compressive stresses. Due to this, concrete gets crushed and spalls off from the outer cover surfaces. In the subsequent cycles, the damage progresses inwards. The effective section gets very much reduced. The columns ends virtually start behaving as pins and the whole framework collapses forming the mechanism shown in Fig. 26.20.



Crushing sequence
1: I cycle movement L to R
2: I cycle movement R to L
3: II cycle movement L to R
4: II cycle movement R to L

Fig. 26.20 Crushing of concrete at column ends

Short column effect When infill walls with wide openings are attached to the columns, the portions of the columns that will deform under lateral seismic loads become very short as compared to their normal height. Such short columns become much stiffer than other columns and attract much larger shear forces, due to which they undergo severe diagonal tension cracking, which leads to the failure and collapse of the column.

Diagonal cracking in columns Columns are subjected to diagonal cracking due to large seismic shears caused by severe ground shaking. If the building twists due to torsion effects, the cracks may take a spiral form, reducing the load capacity of the columns severely.

Diagonal cracking of column–beam joints Many times diagonal cracking occurs through the junction of the column with the beam, which seriously impairs the strength of the frame.

Pulling out of reinforcing bars When the anchor lengths of column bars or overlaps between the longitudinal bars are not adequate for developing the full tensile strength of the bar, they are often pulled out due to the tension caused in the column under the severe reversal of stresses.

Collapse of gable frames Reinforced concrete gable frames, often used for schools, workshops, gymnasia, and assembly halls or cinema halls, have a tendency of spreading out with no secondary resistance available once the joint fails. These are often found to fail and collapse, unless very carefully designed and detailed.

Foundation sinking and tilting Sinking or tilting of the foundations of columns due to seismic shaking occurs in loose soft soils and can lead to severe cracking of the superstructure and the structure can even collapse.

Care in concrete construction In reinforced concrete work, the most important requirement for good behaviour is good quality of concrete, which is usually not achieved in non-engineered constructions. The following are some simple guidelines for preparing concrete of adequate strength and durability.

Measuring materials In non-engineered reinforced concrete constructions, the usual concrete mix proportion is 1:1.5:3 by volume of cement:sand:aggregate. Under no circumstance should a w/c ratio more than 0.45 be adopted. In non-coastal areas M20 and in coastal areas M30 should be the minimum grade adopted. In coastal areas the w/c ratio should be restricted to 0.4. The aggregate may be in the form of river shingle or crushed stone of 20 mm size. A 50-kg cement sack has a nominal volume of 0.0317 m3. It will be best to prepare the concrete mixture using whole bags of cement. For measuring sand and aggregate, a wooden box with handles having a volume equal to one sack of cement will be most accurate as well as convenient to use. The measurement box can also be made of steel sheets.

Mixing materials When mixing is done manually without using a power driven mixer, it should be done on an impervious platform, say, using iron sheets or cemented floor. For making a mix of 1:1.5:3, six boxes of aggregates should first be measured and flattened on the platform, then three boxes of sand should be spread on the aggregate, and finally two full sacks of cement opened on top. The material should first be mixed thoroughly in the dry state so as to obtain uniform colour, and then water should be added. The quantity of water should be enough to make a soft ball of the mixed concrete in hand. A wetter mix is better for hand compaction and a drier mix is better when a vibrator is used for compaction. On any account, water is excess of the 0.45 w/c ratio should not be used. It is advisable to limit the w/c ratio to 0.4 in coastal areas. If necessary, suitable plasticizers can be used for enhancing the workability of the mix.

Formwork Not only the quality of the concrete surface but also the strength of concrete depends on the quality of the formwork and its imperviousness to the leakage or oozing out of the water and cement through the joints. A wooden or steel sheet formwork with well-formed surfaces and joints between the planks or sheets should be used. Water-resistant plywood for the skin of the formwork provides a very good surface for concrete.

Placing of reinforcement While placing reinforcing bars, the following points must be taken care of, otherwise the structure will exhibit undefined weakness. Minimum clear cover to the reinforcement: 20 mm to the bars in the slabs, 25 mm to the bars in the beams, and 40 mm to the bars in the columns. For achieving proper cover, mortar blocks of the required size and quality should be made. They should be properly installed between the bars and the formwork. Tying the blocks with bars with thin soft binding wire will ensure the proper placement of the bars. Mortar bricks should be of good quality so that they do not introduce local weakness below the rebars. The following precautions are necessary while tying the reinforcement cage.

• Tying of longitudinal bars with transverse bars and stirrups and links at each crossing with soft binding wire.

• Minimum overlap in bars: 45 times the diameter of the bar for plain mild steel and 60 times the diameter for high-strength deformed bar. The overlapping portion should preferably be wound with binding wire through the lap length.

• Shape of links and stirrups: the ends of the bars should be hooked by bending them through 180° in mild steel bars and 135° in deformed bars.

• The binding wire should be turned inward after binding so that it does not touch the erected formwork.

Casting and compacting concrete The concrete should normally be cast in one continuous operation so as to avoid discontinuity of more than one hour. Mixed concrete should not be allowed to stay on the platform for more than 45 minutes and must be placed in the forms and compacted continually. Hand compaction must be done by rodding through the freshly placed concrete. Simply levelling the surface with trowels leaves voids in the mass. It may be mentioned that lack of compaction results in a large reduction of concrete strength; hence, utmost attention s`hould be given to this factor. For rodding, good results will be obtained by using 16-mm-diameter rods about 50 cm long. When vibrators are used, formwork should be checked to ensure proper watertightness and the capability to withstand vibration effects.

- Balance Continue in Next Issue

சுருக்கம்

தாம்பரம் பெரு நகராட்சி – உத்தேச விரிவாக்கம் – தாம்பரம் மாநகராட்சியை அமைத்துருவாக்கும் பொருட்டு, 5 நகராட்சிகள் மற்றும் 5 பேரூராட்சிகளை இணைத்தல் – ஆணைகள் – வெளியிடப்படுகிறது.

நகராட்சி நிர்வாகம் மற்றும் குடிநீர் வழங்கல் (தேர்தல்) துறை

நாள்: 11.09.2021

அரசாணை (நிலை) எண்.66 **திருவள்ளுவர் ஆண்டு 2052**
பிலவ, ஆவணி–26.

படிக்கப்பட்டது:

(1) செங்கல்பட்டு மாவட்ட ஆட்சித் தலைவர் கடித எண்.3621/2021/ப.ஆ.2, நாள்.03.09.2021.

(2) நகராட்சி நிர்வாக இயக்குநர் கடித ந.க.எண்.20782/2021/மாநஅ–1, நாள் 04.09.2021.

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ஆணை :

தமிழ்நாடு சட்டப்பேரவையில், 2021–2022 ஆம் ஆண்டிற்கான இத்துறையின் மானியக் கோரிக்கையின் போது, பிறவற்றுடன் கீழ்காணுமாறு அறிவிக்கப்பட்டுள்ளது:–

"2011 ஆம் ஆண்டு மக்கள் தொகை கணக்கெடுப்பின்படி நகர்ப்புற மக்கள் தொகை 48.45 சதவீதம் ஆகும். 2021 ஆம் ஆண்டு தற்போதைய சூழலில் மொத்த மக்கள் தொகையில் நகர்ப்புற மக்கள் தொகை சுமார் 53 சதவீதமாக உயர்ந்துள்ளதென கருதப்படுகிறது. எனவே, மாநகராட்சிகள் மற்றும் நகராட்சிகளை ஒட்டியுள்ள நகர்ப்புரத் தன்மையோடு உள்ள பகுதிகளை நகர்ப்புரங்களோடு இணைத்து தேவையான கட்டமைப்பு வசதிகள் ஏற்படுத்துவது இன்றியமையாததாகக் கருதப்படுகிறது.

தற்போது நகராட்சியாக உள்ள உள்ளாட்சி அமைப்புகளை மாநகராட்சியாகவும், பேரூராட்சிகள் மற்றும் ஊராட்சி அமைப்புகளை நகராட்சியாகவும், அதேபோன்றே மாநகராட்சிகள், நகராட்சிகளில் சிலவற்றை விரிவாக்கம் செய்திடவும் தொடர்ந்து கோரிக்கைகள் வந்தவண்ணம் உள்ளன.

தற்போதுள்ள நகர்ப்புற உள்ளாட்சிகளைச் சுற்றியுள்ள பகுதிகளில், நகர்ப்புரத்தன்மை, மக்கள் தொகை, மக்கள் தொகை அடர்த்தி, ஆண்டு வருமானம், பொருளாதார முக்கியத்துவம் உள்ளிட்ட பல்வேறு காரணிகளின் அடிப்படையிலும் நகர்ப்புரமாக மாறி வருகின்ற இந்த பகுதிகளிலும் நகரத்திற்கு இணையான அடிப்படை வசதிகளை அளித்திடும் நோக்கிலும் உள்ளாட்சி அமைப்புகள் தரம் உயர்த்தப்படுகிறது"

2. இதன்படி, "தாம்பரம், பல்லவபுரம், செம்பாக்கம், பம்மல், அனகாபுத்தூர், ஆகிய நகராட்சிகள் மற்றும் அதனைச் சுற்றி அமைந்துள்ள பேரூராட்சிகள் மற்றும் ஊராட்சிகளையும் ஒன்றிணைத்து ஒரு மாநகராட்சியாக அமைக்கப்படும்" என அறிவிக்கப்பட்டுள்ளது.

3. இதனைத் தொடர்ந்து, மேற்படி அறிவிப்பின் அடிப்படையில், புதிய மாநகராட்சியை அமைத்து உருவாக்குவது தொடர்பான செங்கல்பட்டு மாவட்ட ஆட்சியரின் பார்வை (1)–ல் படிக்கப்பட்ட செயற்குறிப்பில், கீழ்காணும் 4 நகராட்சிகள் மற்றும் 5 பேரூராட்சிகளை தாம்பரம் பெருநகராட்சியுடன் இணைத்திட தீர்மானம் நிறைவேற்றியுள்ளதாக தெரிவித்துள்ளார்.

மேலும், இதனுடன் 15 கிராம ஊராட்சிகளையும், இணைத்திட தீர்மானம் நிறைவேற்றியுள்ளதாக தெரிவித்துள்ளார்.

வ.எண்.	உள்ளாட்சியின் பெயர்
	நகராட்சிகள்
1	பல்லவபுரம்
2	பம்மல்
3	செம்பாக்கம்
4	அனகாபுத்தூர்
	பேரூராட்சிகள்
5	சிட்லபாக்கம்
6	மாடம்பாக்கம்
7	பெருங்களத்தூர்
8	பீர்க்கங்கரணை
9	திருநீர்மலை

4. மேலும், செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில், தாம்பரம் நகராட்சி 20.72 சதுர கிலோமீட்டர் பரப்பளவு கொண்டதாகும் எனவும், 2011 ஆம் ஆண்டு மக்கள் தொகைக் கணக்கெடுப்பின்படி மக்கள் தொகை 1,74,787 மற்றும் தற்போது 2021 ஆம் ஆண்டின் தோராய மக்கள் தொகை 2,41,332 ஆகும் எனவும், தாம்பரம் நகராட்சியின் 2020–21 ஆம் ஆண்டிற்கான மொத்த வருவாய் ரூ.90.57 கோடியாகும் எனவும் தெரிவித்துள்ளார். தாம்பரம் நகராட்சி சேலையூர், தாம்பரம் கடப்பேரி, இரும்புலியூர் மற்றும் புலிக்கொரடு ஆகிய 5 வருவாய் கிரமங்களை உள்ளடக்கியதாகும் எனவும், தாம்பரம் நகராட்சி தென்னக ரெயில்வே ஊழியர்கள் குடியிருப்பு மற்றும் இந்திய விமான படையை சார்ந்த இடங்கள் நீங்கலாக மீதம் உள்ள பகுதிகள் 39 வார்டுகளாக இருந்து வருகின்றன எனவும் தெரிவித்துள்ளார்.

5. செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில், தாம்பரம் பகுதி சென்னை பெருநகரத்தின் நுழைவாயிலாக உள்ளதுடன் ஜி.எஸ்.டி சாலையில் உள்ள பன்னாட்டு நிறுவனங்கள் பலவும் அமைந்துள்ள MEPZ (Madras Export Processing Zone) மூலம் இந்நகராட்சிக்கு வருவாய் ஈட்டித் தருகிறது எனவும், பழமையும், பெருமையும் நிறைந்த சென்னை கிறித்துவ கல்லூரி மற்றும் பள்ளிகள் போன்ற சிறந்த கல்வி நிறுவனங்கள் நிறைந்துள்ளன எனவும் குறிப்பிட்டுள்ளார். மேலும், சென்னையில் அமையப்பெற்றுள்ள புகழ் பெற்ற வியாபார நிறுவனங்கள் பலவும் அவற்றின் கிளைளை தற்போது தாம்பரத்தில் நிறுவி உள்ளதாகவும், இதன் மூலமும் தாம்பரம் நகராட்சிக்கு வருவாய் உயர்ந்திட வழிவகை ஏற்பட்டுள்ளதாவும் தெரிவித்துள்ளார்.

6. மேலும், தாம்பரம் நகராட்சி எல்லையை சுற்றியுள்ள பகுதிகள் அனைத்தும் தாம்பரம் நகராட்சிக்கு சமமாக வளர்ந்து வருகின்றன எனவும், எனவே தாம்பரம் நகராட்சியைச் சுற்றியுள்ள பகுதிகளுக்கும் அடிப்படை வசதிகளான குடிநீர், பாதாளச் சாக்கடை போன்றவற்றை விரிவுபடுத்த வேண்டியது அவசியமாகிறது எனவும், மேலும், பெருநகர சென்னை மாநகராட்சியுடன் இதனைச் சுற்றியுள்ள பகுதிகளும் இணைந்துள்ளதால் அதற்கு ஈடாக தாம்பரம் நகராட்சியை மாநகராட்சியாக தரம் உயர்த்த வேண்டியது அவசியமாகிறது எனவும் செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில் தெரிவித்துள்ளார். தாம்பரம் மற்றும் பல்லவபுரம் நகராட்சிகள் தேர்வுநிலை நகராட்சியிலிருந்து சிறப்புநிலை நகராட்சிகளாக அரசாணை எண்.238, நகராட்சி நிர்வாகம் மற்றும் குடிநீர் வழங்கல் துறை, நாள்: 02.12.2008–ன்படி தரம் உயர்த்தப்பட்டுள்ளது எனவும் தெரிவித்துள்ளார்.

7. தாம்பரம் நகராட்சியுடன் இணைக்க உத்தேசிக்கப்பட்டுள்ள நகராட்சிகள் மற்றும் பேரூராட்சிகளின் கீழ்காணும் விவரங்களையும் செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில் தெரிவித்துள்ளார்:–

வ. எண்	உள்ளாட்சியின் பெயர்	நிலை	பரப்பளவு ச.கி.மீ	2011–ம் ஆண்டின் மக்கள் தொகை	தற்போதைய மக்கள் தொகை 2021	கடைசி 3 ஆண்டு சராசரி வருமானம் (ரூ.கோடி)	2020–ம் ஆண்டின் வருமானம் (ரூ.கோடி)
1	2	3	4	5	6	7	8
			நகராட்சிகள்				
1	தாம்பரம்	சிறப்பு நிலை	20.72	174787	241332	109.42	90.57
2	பல்லவபுரம்	சிறப்பு நிலை	18.00	215452	296844	121.81	101.39
3	பம்மல்	தேர்வு நிலை	13.81	75870	89379	23.19	22.73
4	செம்பாக்கம்	இரண்டாம் நிலை	6.25	45356	66340	18.27	21.51
5	அனகாபுத்தூர்	இரண்டாம் நிலை	4.00	48050	54944	15.16	12.84
			பேரூராட்சிகள்				
6	சிட்லபாக்கம்	சிறப்பு நிலை	2.90	37906	40000	12.90	11.37
7	மாடம்பாக்கம்	சிறப்பு நிலை	8.02	31681	50114	11.72	10.54
8	பெருங்களத்தூர்	சிறப்பு நிலை	7.35	37342	50934	22.61	21.26
9	பீர்க்கங்கரணை	தேர்வு நிலை	1.79	25871	35000	6.82	7.33
10	திருநீர்மலை	சிறப்பு நிலை	4.80	30702	36000	6.17	4.39
		மொத்தம்	87.64	723017	960887	348.07	303.93

8. செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில், தாம்பரம் நகராட்சி மற்றும் தாம்பரம் நகராட்சியுடன் இணைக்க உத்தேசிக்கப்பட்டுள்ள மேற்காணும் நகராட்சிகள் மற்றும் பேரூராட்சிகளின் மன்ற ஒப்புதல் தீர்மானம் பெறப்பட்டுள்ளதாக தெரிவித்து, தீர்மானங்களின் நகலை இணைத்தனுப்பி வைத்துள்ளார்.

9. மேலும், செங்கல்பட்டு மாவட்ட ஆட்சியர் தனது கடிதத்தில், நகராட்சிகள் மற்றும் மாநகராட்சிகளால் வழங்கப்படும் அடிப்படை வசதிகள் மற்றும் சேவைகள் அனைத்தும் பேரூராட்சிகளுக்கும் சென்றடையும் பொருட்டு, இப்பகுதிகளை தாம்பரம் நகராட்சியோடு இணைத்து புதிய மாநகராட்சியாக தரம் உயர்த்துவதால் இப்பகுதிகளில் குடியிருக்கும் மக்களுக்கு மிகவும் பயனுள்ளதாக அமையும் என குறிப்பிட்டுள்ளார். மேலும், இவ்வாறு தரம் உயர்த்தப்படுவதால் மேலே குறிப்பிடப்பட்டுள்ள அனைத்து பகுதிகளிலும் குடியிருக்கும் பொது மக்களின் வாழ்க்கை தரம் உயர்வதுடன், அடிப்படை வசதிகள், கட்டமைப்பு மேம்பாடு, மேம்படுத்தப்பட்ட சுகாதாரம் மற்றும் மருத்துவ வசதிகள் பொது மக்களுக்கு கிடைக்கும் எனவும், இந்த மேம்பாட்டினால் பொருளாதார நடவடிக்கைகள் மற்றும் புதிய தொழிலகங்கள் ஏற்படவும், வேலைவாய்ப்புகள் உருவாகவும், வருவாய் பெருகவும் அனைத்து தரப்பு வளர்ச்சிக்கும் வழிவகுக்கும் எனவும் மாவட்ட ஆட்சியர் குறிப்பிட்டுள்ளார்.

10. எனவே, தாம்பரம் நகராட்சிக்கு அருகில் உள்ள பல்லவபுரம், பம்மல், அனகாபுத்தூர், செம்பாக்கம் ஆகிய 4 நகராட்சிகள் மற்றும் சிட்லபாக்கம், பெருங்களத்தூர், மாடம்பாக்கம், திருநீர்மலை, பீர்க்கங்கரணை ஆகிய 5 பேரூராட்சிகளை தாம்பரம் நகராட்சியுடன் இணைத்து புதிய மாநகராட்சியாக தரம் உயர்த்துவதற்கான செங்கல்பட்டு மண்டல நகராட்சி நிர்வாக இயக்குநரின் செயற்குறிப்பினை பரிந்துரை செய்து அனுப்பி வைப்பதாக செங்கல்பட்டு மாவட்ட ஆட்சியர் தெரிவித்துள்ளார்.

11. மேற்குறிப்பிடப்பட்டுள்ள நிலையில், செங்கல்பட்டு மண்டல நகராட்சி நிர்வாக இயக்குநர், செங்கல்பட்டு மாவட்ட ஆட்சியர் ஆகியோரின் செயற்குறிப்பின் அடிப்படையிலான நகராட்சி நிர்வாக இயக்குநரின் பார்வை (2)–ல் படிக்கப்பட்ட செயற்குறிப்பினை அரசு கவனமாக பரிசீலனை செய்து, தாம்பரம் மாநகராட்சியை அமைத்துருவாக்கும் பொருட்டு, கீழ்காணும் 5 நகராட்சிகள் மற்றும் 5 பேரூராட்சிகள் இணைக்கப்படலாம் என உத்தேச முடிவு மேற்கொண்டு அவ்வாறே ஆணையிடுகிறது:–

வ.எண்.	உள்ளாட்சியின் பெயர்
	நகராட்சிகள்
1	தாம்பரம்
2	பல்லவபுரம்
3	பம்மல்
4	செம்பாக்கம்
5	அனகாபுத்தூர்
	பேரூராட்சிகள்
6	சிட்லபாக்கம்
7	மாடம்பாக்கம்
8	பெருங்களத்தூர்
9	பீர்க்கங்கரணை
10	திருநீர்மலை

12. இதனடிப்படையில், தாம்பரம் நகராட்சியுடன் 4 நகராட்சிகள் மற்றும் 5 பேரூராட்சிகள் ஆகியவற்றை இணைப்பது (INCLUSION) தொடர்பாக 1920 ஆம் ஆண்டு தமிழ்நாடு மாவட்ட நகராட்சிகள் சட்டத்தின் பிரிவு 4ன் வகைமுறைகளின்படி தேவையான நடவடிக்கைகள் மேற்கொள்ளப்படும். அவ்வாறே, மேற்குறிப்பிடப்பட்டுள்ள 4 ஆம் பிரிவின் (1) ஆம் உட்பிரிவின், (c) எனும் கூறின் கீழ், இவ்வாணையுடன் இணைக்கப்பட்டவாறான அறிவிக்கை (ஆங்கிலத்தில்) 11.09.2021 ஆம் தேதியிட்ட தமிழ்நாடு அரசிதழின் சிறப்பிதழில் வெளியிடப்படும்.

13. மேலும், பத்தி 3-ல் குறிப்பிடப்பட்டுள்ள ஊராட்சிகளை இணைப்பதற்கான மேல் நடவடிக்கைகள் பின்னர் தனியே மேற்கொள்ளப்படும்.

(ஆளுநரின் ஆணைப்படி)

சிவ் தாஸ் மீனா

அரசு கூடுதல் தலைமைச் செயலாளர்

APPENDIX.

NOTIFICATION.

In exercise of the powers conferred by clause (c) of sub-section (1) of section 4 of the Tamil Nadu District Municipalities Act, 1920 (Tamil Nadu Act V of 1920), the Governor of Tamil Nadu hereby declares his intention to include within the jurisdiction of Tambaram Municipality, the entire areas comprised in the following local authorities, so as to constitute the same as a City Municipal Corporation:-

Sl.No.	Names of the local authorities
(1)	Pallavapuram Municipality
(2)	Pammal Municipality
(3)	Sembakkam Municipality
(4)	Anakaputhur Municipality
(5)	Chitlapakkam Town Panchayat
(6)	Madambakkam Town Panchayat
(7)	Perungaluthur Town Panchayat
(8)	Peerkankaranai Town Panchayat
(9)	Tiruneermalai Town Panchayat

Based on the above inclusion, wards will be divided for the next ordinary election.

2. Any inhabitant of the said local areas or tax payer of the Municipalities, who desires to object the proposal, may submit his objection in writing to the Government of Tamil Nadu within six weeks from the date of publication of this Notification in the Tamil Nadu Government Gazette. Objections, if any, in writing should be addressed to the Additional Chief Secretary to Government, Municipal Administration and Water Supply Department, Secretariat, Fort St.George, Chennai-600 009.

SHIV DAS MEENA

ADDITIONAL CHIEF SECRETARY TO GOVERNMENT

//True Copy//

Section Officer

SOUTHERN CENTRE ACTIVITIES

07.09.2021

சொசைட்டியின் 38வது வருடாந்திர மகாசபைக் கூட்டம் டாக்டர் ராமகிருஷ்ணா அரங்கத்தில் மாலை 4.00 மணிக்கு நடைபெற்றது. இதில் சொசைட்டி உறுப்பினர்கள் கலந்து கொண்டனர்.

14.09.2021

தென்னக மய்யத்தின் 71வது வருடாந்திர மகாசபைக்கூட்டம் டாக்டர் ராமகிருஷ்ணா அரங்கத்தில் மாலை 4.00 மணி அளவில் நடைபெற்றது. இதில் அகில இந்திய முன்னாள் தலைவர் பீஷ்மா R. இராதாகிருட்டிணன், உடனடி முன்னாள் அகில இந்தியத் தலைவர் திரு. Mu. மோகன், அகில இந்திய துணைத் தலைவர் திரு. S. அய்யநாதன், மாநிலத் தலைவர் திரு. R. சிவக்குமார், மய்யத் தலைவர் திரு. L. சாந்தகுமார், தென் மண்டல செயலாளர் திரு. K. வெங்கடேசன், மாநிலச் செயலாளர் திரு. S. இராமப்பிரபு, மாநிலப் பொருளாளர் திரு. T.V. சந்திரசேகர், மய்ய நிர்வாகிகள் மற்றும் செயற்குழு பொதுக்குழு உறுப்பினர்களும் கலந்து கொண்டு சிறப்பித்தனர்.

15.09.2021

தென்னக மய்யத்தின் 6வது செயற்குழு மற்றும் பொதுக்குழு கூட்டம் Accord Metro Politan Hotel, Chennai-17ல் திரு. K. கோபிநாத், திரு. A. சத்தியநாராயணா, திரு. P.K.P. நாராயணன், திரு. M. செந்தில்குமார், திரு. K. K. சவுத்திரி, திரு. M.N. பாலசுந்தரம் ஆகியோரின் உபசரிப்பில் நடைபெற்றது.

22.09.2021

திரு.சுகன்தீப் சிங் பேடி, ஆணையர், சென்னை பெருநகர மாநகராட்சி அவர்களை அகில இந்திய கட்டுநர் வல்லுநர் சங்கம் சார்பாக உடனடி முன்னாள் அகில இந்தியத்தலைவர் திரு. Mu. மோகன், மாநிலத்தலைவர் திரு. R. சிவக்குமார், தென்னக மய்யத்தலைவர் திரு. L. சாந்தகுமார், தென்னக மய்ய இணைச்செயலாளர் திரு. R. நிம்ரோட் ஆகியோர் நேரில் சந்தித்து வாழ்த்து தெரிவித்தனர்.

29.09.2021

அன்று பொதுப்பணித்துறை கூட்ட அரங்கில் 74வது Product Assessment Committee கூட்டத்தில் மாநிலத்தலைவர் திரு. R. சிவக்குமார் அவர்களும், முன்னாள் மய்யத்தலைவர் திரு. L. வெங்கடேசன் அவர்களும் கலந்து கொண்டு தமது கருத்துக்களை பதிவு செய்தனர்.

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