

Recent Failures ---

1. Delhi Airport Terminal-1 Roof Collapsed
2. Jabalpur Airport Roof Collapsed
3. Approx. 5 Bridge collapsed in last few days in Bihar
4. Major Cracks in Mumbai Trans Harbour Link Road.
5. Hoarding Failure in Mumbai
6. Rajkot Airport - Canopy Collapsed

Structural failure can't be handled it affects human life immediately. Safe Structure should be a priority in the construction cycle.

STRUCTURAL ENGINEERING PROFESSION CURRENT STATUS

We discuss several issues faced by Structural Engineers. Although the entire construction cycle depend on Structural Engineers, yet it is given least importance. Society by and large don't know the work of Structural Engineers. Neither are there any articles in newspapers, for sanitizing the importance of structure, maintenance, Structural Audit every 5 years to public. In the construction cycle Structural Engineers implement IS codes, yet no central legal registration/authorization by Government.

With recent upgradation of IS Codes, the importance of its proper implementation has to be undertaken for which Authorization for Structural Engineers is required for delivering qualitative work. In the entire construction cycle Structural Engineers represent govt. and implement IS Codes on Site. They should have proper Authorization by central govt. Structural Engineering is a highly specialized Skill & demands its due importance in the project.

These problems need to be addressed at the earliest for the profession, and also safety of public. If Structural Engineers do their work properly the public will be safe. We have seen recent structures being damaged in Syria & Turkey during Earthquake in year 2023 and loss of life for many innocent residents. In India the damage to structures during earthquake has been seen, like in Bhuj, Gujarat and also in less magnitude earthquakes cracks, settlements have been seen in Structures.

While the country's infrastructure is being measured in terms of its infrastructure development, the backbone professionals of the projects, Structural Engineers are working in unorganized environment without proper government authorisations/central registration no., without recognition onsite, without any mention in project media coverage.

Scattered associations have not done work for improvement of working environment, neither represented a united front to government for proper central registration number, no media public awareness for the work of structural engineers, few proper printed journals for structural engineering available.

Professions like CA, Medicine are specialized, are growing with support by proper govt. registration system, supported by govt. rules, supported by their industry. Our profession is highly specialized and not getting proper value and no support from govt or industry.

Architects, interior designers bring in concepts of floating columns, flat slabs, column less spaces, open stilt floor parking, unsymmetrical building shapes, economical structure, reduced section sizes, less steel which affect the structure. Its affects have been seen in practical during earthquakes in Bhuj

2001, Gujarat, (where multistoried collapsed) and recently in Syria & Turkey where large scale collapse of multi storied structures. Yet public perception is so developed that buildings should look good , and safety is not a priority. People are not aware of their safety, in small magnitude earthquake in India, people have come out of their houses/buildings in midnight. Dwelling units should be centered around safe structure and hence structural engineers should be most important.

The element of Risk is addressed by Structural Engineer in the project. The structure is designed to withstand earthquake, wind, rains or gravity forces in its life time. The professional covering risk has to be paid more than any other for his services. This is universal concept, Structural Engineering should be no exception. Other services depend on structure. Even civil engineers can do planning & architecture. The world can survive without architects, interior designers, false ceiling, painter, carpenter, etc but can not survive without structural engineer because the structure protects humans from rain, wind, earthquake, fire(to certain extent).

Civil Engineers very keen & enthusiastic for structural design should undertake Masters Course/PhD in Structural Engineering for specialization & then work in projects.

STRUCTURAL ENGINEERING PROFESSION ISSUES

1. Structural Engineering is basis for bringing project on ground. Be it Architects, Interior Designers, painters, plumbers, utilities depend on structure. First the Structure is built then other services are added. Yet it is highly neglected.
2. Loss of importance of Structural Engineering Profession
3. Extremely low structure design fees. Currently Fees is not as per work, responsibility of the project.
4. Identity unknown to Clients, society at large. Public know Architects, Interior Designers, Masons, Carpenters, Plumbers, Painters but not Structural Engineers and details of their work.
5. Architects shadow Structural Engineer work to customers. Structural Engineer work is more important than Architect, yet Structural Engineer works as per instructions by Architect. Planning without considering structural perspective have lead to numerous design flaws & damage to structure in event of earthquake. Structural requirement should be kept a priority as human life safety is more important than aesthetics of building.
6. Cement & Steel Companies giving no recognition to Structural Engineers. No display of reference to Structural Engineers on Website/Cataloug/onsite.
7. Cement & Steel Dealers don't know Structural Engineers who work with their products. They don't refer Structural Engineers to public/customers.
8. No mention of Structural Engineer on Project Sites, Project Brochure, Project Websites.
9. End Consumers not provided information on the Structural Engineer role in the structure and its safety by Architects, Builders, Interior Designers.
10. No legal central registration or licensing by government departments. Structural Engineers implement IS codes on ground in interest of Public Safety, still no licensing/authority by Government for making mandatory approval for construction by Structural Engineers. In the entire project cycle the Structural Engineer is govt. representative implementing numerous IS Codes yet no support by govt. Structural Engineers recommendations Architect/Contractor/Builder should follow in interest of Public Safety, IS Codes by govt.
11. Local Govt. Bodies providing registration to Architects for Survey, Architectural /Structure Design & Drawings but not Structural Engineers. Architects have overshadowed Structural Engineers.

12. Constant Pressure from Architects, builders for economical sections/less steel leading to Unsafe designs. Many failures have occurred in recent past.
13. Structural Designs also done by non qualified persons, copy of designs/drawings/details for similar projects, use of typical designs in multiple projects, etc.
14. Concept of typical floor for fee reductions, although nothing is typical in structure as the entire structural model is affected with each floor, or member or load. Each structure is different, its design is different. If the floor is typical, doesn't it affect the column or foundation design, it does.
15. No RFI system for carrying out inspections on site. Contractor should give RFI to Structural Engineer, after inspections, RFI to be signed and attached for final Stability Certificate issue by Structural Engineer.
16. Delayed Fees, Over negotiated, low Fees. Rather than proper fees, fees are low to the input of work, IS Codes references, Analysis, Design, Drawings, Site Inspections for a life long structure.
17. Brand of Steel/Cement/ Concrete (RMC), Prestressed Steel with onsite test reports not approved by Structural Engineer.
18. Use of different materials by Architects, builders without written approval by Structural Engineer. Say RCC porch substituted by Tensile Membrane Structure due to elevations, architecture.
19. Labour contractor rates better than Structural Engineering Fees, affecting talent from entering profession. Labour contractor for plumbing/electric/painter/carpenter/false ceiling/tile& marble have higher charges, better payment terms than Structural Engineers.
20. Work pressure, small time lines affect quality. Shift of attitude of clients from safe structure to economical structure. With high selling apartments/flats, the focus is on least cost of structure & least structure design fees. Buyers can pay for interior design, excellent floors, kitchens, wash rooms, latest electricals, beautiful wall finishes, but not structure.
21. Extremely Low Fees paid by per sq.ft. , like labour rates carpenters, tile masons are paid. Being a 3 dimensional structure fees should be on percentage of total cost of Building. While flat rates in metros and cities are very high, the structural engineers are being paid low sq.ft. rates.
22. With the analysis, design involved in the structure. Structural Engineer Fees should be higher than Architect/Interior Designer & other service provider(labour contractors). It is just not planning, drawing & autocad, but its physics & mathematics and bringing concept to ground for other services implementation. It is working as per govt IS Codes & implementing on site, representing Govt. The skill & work is most valuable & charges should be highest.
23. With low fees for structural engineers, they have lost value in front of builders, architects, interior designers, contractors, public. Society by large don't know Structural Engineer & contribution in their life & safety.
24. Architects doing planning as per their will with least consideration of Structure, they take decisions and direct Structural Engineers. Although for dwelling units , safety should be priority, then elevations & plans and Structural Engineer should be decision maker.
25. In case of failure of any structure the Architect, Contractor/Builder responsible.
26. No pan India Structural Union, Structural Association for proper representation at govt. level.
27. Structural Engineering is crucial for any project, the work is most important for any project. The fees should be proportional to the work & responsibility.

Better Fees will help in growth of Structural Engineers, better support team, attending more conferences, purchasing more books & literature, better software, better analysis, designs & drawings, better use of cement/steel materials, better public safety.

REMEDIAL MEASURES

1. Government should make central licensing system for Structural Engineers. Registration no. to be put on drawings.
2. Only duly qualified M Tech/PhD Structural Engineers could undertake designs & sign on drawings. Proper post graduation degree in structural engineering with experience should be a must like specialized doctors qualified to undertake a surgery.
3. Mandatory authorization to Structural Engineers for producing SAFE designs by government for all small ,medium & big structures/projects. IS Codes implementation should be done by authorized Structural Engineers.
4. Structural Engineer should take important decisions in planning , placing of columns, beams, architects, builders to follow. Safety should be priority then elevations & plans.
5. Structural Design Fees should be percentage of cost of project as it is mother of all other services, say 1-1.5% or higher.
6. RFI System on all sites, after due site inspection, fees clear upto that floor, then RFI to be signed by Structural Engineer, allow concreting.
7. Stability certificate mandatory for all structures, G+1 or more, water tanks, and others duly signed by authorized structural engineer. RFI signed copies to be submitted along with Stability Certificate to Local Govt. Body for giving possession(public use NOC).
8. Periodic Structural Audit for all important Structures by duly qualified & experienced Structural Engineer.
9. Payment Schedule to be formulated and to be properly followed for structural engineer fees.
10. Fees Schedule – Foundation + Floor Wise (before concreting). Basic Fees region wise, type of structure, no. of floors, to be declared every year by the Union. Any changes , revisions , extra charges for Structural Engineer.
11. Structural Engineers Union to address to any issues regarding quality of work of design, undue pressure from Architects, Builders, Contractors, non payment of bills.
12. Legal Action on non qualified professionals, non qualitative work, copy of Structural Drawings, by Union.
13. Annual Pan India Conference.
14. Support from Cement, Steel, Prestressing Steel, Expansion Joints, Bearing, Couplers, Manufacturers Industry for Annual Conferences, Structure Awards, Site Visits, Latest Technology exposures/factory visit/project site visits/ upgradations to Structural Engineers.
15. Additionally Cement & Steel Industries to promote public awareness for Buildings to be SAFE rather only beautiful, to have Structural Engineer in each project and follow his recommendation. Reels, Videos, documentaries featuring Structural Engineers and their work should also be developed for society and available on social media widely circulated.

The discussion above may be carried forward by Senior Structural Engineering professionals, Structural Design Companies at government level for interest of public safety.
