Volume No 2
October 2014

Innovative Informative Educative

BeaCon

www.mcetcivilbeaverss.wordpress.com

AIM BEYOND THE HORIZON

Dr. Mahalingam College of Engineering and Technology
Department of Civil Engineering

VISION AND MISSION OF THE INSTITUTION

Vision

We develop a globally competitive workforce and entrepreneurs

Mission

Dr. Mahalingam College of Engineering and Technology, Pollachi endeavors to impart high quality, competency based technical education in Engineering and Technology to the younger generation with the required skills and abilities to face the challenging needs of the industry around the globe. This institution is also striving hard to attain a unique status in the international level by means of infrastructure, state-of-the-art computer facilities and techniques

VISION AND MISSION OF THE DEPARTMENT

VISION

To develop Competent Civil Engineers to meet the infrastructure challenges of India and the world.

MISSION

- To become one of the reputed departments offering Civil Engineering Program in the country.
- To produce excellent engineers to cope up with the changes through dynamic, innovative and flexible curriculum.
- To provide a conducive environment for teaching & learning and to develop leaders with effective communication skills.
- To conduct quality research driven by industry & societal needs and provide affordable engineering solutions.

The Programme Educational Objectives (PEOs) of our department are,

The Programme Educational Objectives (PEOs) of our department are,

The Graduate will

PEO 1 Technical Expertise: Have successful professional careers dealing with analysis, design and management of construction projects globally.

PEO 2 Lifelong learning: Exhibit attitude, professionalism, ability to communicate with team members and adapt to the latest trends by engaging themselves in continuous learning.

PEO 3 Ethics: Ethically apply their engineering knowledge and skills considering, societal, economic and environmental factors.

PROGRAMME OUTCOMES (POs)

The graduates of Civil Engineering Programme will be able to:
PO1.Engineering knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization in the field of Civil Engineering.
PO2. Problem analysis: Identify, formulate, analyse and solve complex problems in construction industries using principles of mathematics, natural sciences and engineering sciences.
PO3. Design/development of solutions: Design a solution for complex civil engineering problems and design system processes to meet specific needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4. Conduct investigations of complex problems: Conduct investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusion.
PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7. Environment and sustainability: Understanding the impact of engineering solutions in social environment and demonstrate the knowledge for sustainable expansion.
PO8. Ethics: Apply ethical principles and commit to professional ethics and the norms of engineering practices.
PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO10. Communication: Communicate with engineers and society to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions related to civil engineering professionals.
PO11. Project management and finance: Demonstrate and apply the knowledge of engineering and management principles to one's own work, as a team leader or a member to manage project in multidisciplinary environments.
PO12. Life-long learning: Recognize the need for, and have the ability to engage in independent and life-long learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1. Design process:Design the fundamental elements of civil engineering systems, system components and processes considering safety, quality and cost consideration.
PSO2. Quality and standards:Able to plan and prepare design and construction documents such as specifications, contracts, engineering drawings and construction schedules

Crumbling Infrastructure

When it comes to the precipitous decline in the reliability and efficiency of America's infrastructure, its not just bridges we should be thinking about. The nation's water infrastructure is falling apart, much of it tainted with heavy metals and leaking like a sieve simply due to its age. The Unseen Decline of America's Infrastructure: Decaying Pipes, Antiquated Networks That America's infrastructure is falling apart is clear. Bridge collapses, degraded roadways, and rusting factories are common from coast to coast. But perhaps more dangerous in terms of both public health and America's economic competitiveness is the creeping decay of our hidden, yet equally vital water and information technology infrastructure. The fact of the matter is that pipes decay over time, and technological developments render older IT systems obsolete, or at least terribly inefficient compared to newer systems. But rather than confront the problem head-on, public sector paralysis has led to these essential systems being neglected for far longer than is prudent. And as a result, America's public utilities and IT systems are growing more and more inefficient, requiring increased funds just to keep the current system in some semblance of operating order. Clearly this is not an ideal way to be spending tax dollars or, in the case of privately owned telecommunications technology, revenues that might otherwise be reinvested in share price or in reducing service charges to users.

Crumbling Infrastructure

But even though it is clear that our priorities need to change, revitalizing America's crumbling infrastructure has attracted little in the way of concrete attention, research, and most of all investment. What funding has been allocated generally gets used to fund highly visible highway and bridge maintenance. This, while important, misses an important point: when it comes to maintaining infrastructure, it's not just about bridges and roads and dams. It's about keeping neighborhood and business water use as efficient as possible, and making sure growing businesses that require intensive use of telecommunications capabilities have access to the bandwidth they need. As I've argued before, America needs a new WPA to revitalize its dying infrastructure. But this WPA must focus on more than visible projects - it must counteract the decay occurring beneath our collective feet.

Water Systems: The Source and Cost of Degradation Water is the most fundamental resource on the planet when it comes to sustaining life. Where there is no water, human life cannot survive for more than a few days, and sustaining a civilization is absolutely impossible if supplies of clean fresh water cannot be sustained. Determining how to bring fresh water where it is needed and carry away waste water was a major problem for all developing civilizations in ancient history. Probably the best known example of an effective water system was that of the Roman aqueducts, which brought water to Rome and carried waste water away from the city. This concept has actually changed very little in the intervening two thousand years since Rome was great, and under our cities and neighborhoods a complex network of water systems is spread to bring water where it is needed and carry sewage away from our homes and businesses. Many communities still rely on water that is piped in from hundreds of miles away, and an effective sewage treatment system is essential for every town in America. But water systems are a classic example of out of sight, out of mind: few politicians (if any) have been elected on a slogan of rebuilding America's sewers. Unfortunately this neglect, of minor consequence when water systems were but a decade or two old, has now led to a century or more of degradation managed only by a few technicians with limited budgets. And the result is clear.

T KAVIN (12BCE021)
K SAKTHIVEL (12BCE041)

Students Participation in Activities

Harish Balaji	I Prize Paper Presentation	SKET Coimbatore
V.Athirai	II Prize Paper Presentation	SKET Coimbatore
A.Mohammed Rajudeen	Dimenzera II Prize	BIT Sathy
B.J.Aravind	Technical Quiz I Prize	GCE Salem
A.Mohammed Rajudeen	Rahbilito I Prize	GCE Salem
M.Sandhiya	Tehnical Quiz II Prize	MEPCO Erode
N.Lakshmi Priya	Confloat II Prize	CEG Chennai
T.Siva Priya	Confloat II Prize	CEG Chennai

Thanjavur Periya kovil

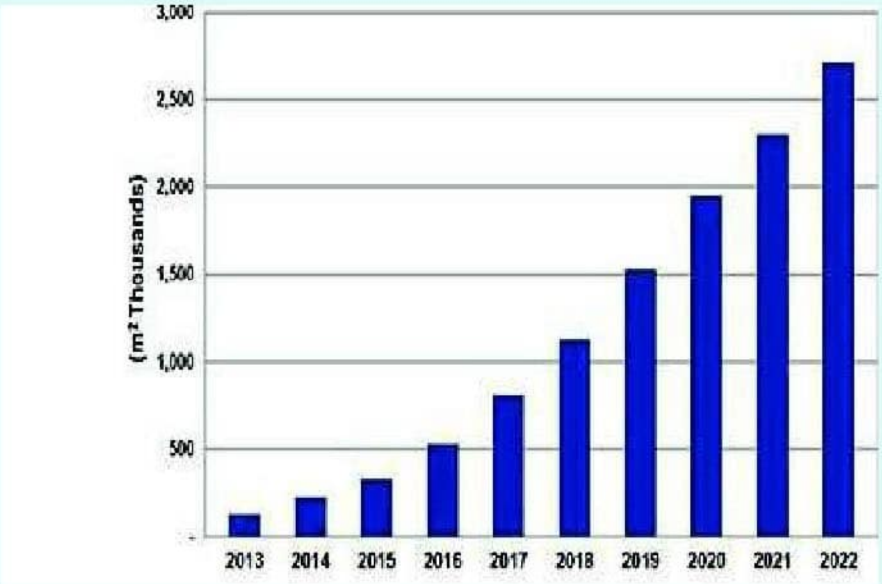
Thanjavur Periya kovil (also known as Brihadeeswarar temple) is a Hindu temple dedicated to Lord Shiva located in Thanjavur in the Indian state of Tamil Nadu. It is also known as RajaRajeswara Temple Rajarajeswaram and Brihadeshwara Temple. It is one of the largest temples in India and is an example of Tamil architecture during the Chola period. Built by Raja Raja Chola I and completed in 1010 CE, the temple turned 1000 years old in 2010.The architect and engineer of the temple, Kunjara Mallan Raja Raja Perumthachan is revered today as a father figure to all craftsmen in his homeland of present-day Central Kerala. The temple is part of the UNESCO World Heritage Site known as the "Great Living Chola Temples", with the other two being the Brihadeeswarar Temple, Gangaikonda Cholapuram and Airavatesvara temple.

The temple stands amidst fortified walls that were probably added in the 16th century. The vimanam (temple tower) is 198 ft (60 m) high and is one of the tallest in the world. The Kumbam (the apex or the bulbous structure on the top) weighs around 80 tons. There is a big statue of Nandi (sacred bull), carved out of a single rock measuring about 16 ft (4.9 m) long and 13 ft (4.0 m) high at the entrance. The entire temple structure is made out of granite, the nearest sources of which are about 60 km to the west of temple. The temple is one of the most visited tourist attractions in Tamil Nadu.

The solid base of the temple raises about 5 metres (16 feet), above which stone deities and representatives of Shiva dance. The big Nandi (bull), weighing about 20 tonnes is made of a single stone and is about 2 m in height, 6 m in length and 2.5 m in width. The presiding deity of lingam is 3.7m tall. The prakaram (outer precincts of the temple) measures 240m by 125m. The outer wall of the upper storey is carved with 108 dance karanas – postures of Bharathanatyam, the classical dance of Tamil Nadu. The shrine of Goddess was added by Pandyas during the 13th century, Subramanya Shrine by Vijayanagara rulers and the Vinayaka shrine was renovated by Maratha rulers. There were significant additions from the Thanjavur Nayaks.

M SINDUJA (12BCE048)

New Developments in Glass Technology Could Make Every Structure Green



The development and increasing availability of "smart" glass technology could bring significant chang-es to the design of struc-tures and transporta-tion. As prices drop and supplies grow, so-called "smart" glass has the potential to redefine and engineers design the ex--terior of buildings to meet sustainability criteria, according to a report re-leased last week by the London office of Navigant Research, Smart Glass: Electrochromic, Suspended Particle, and Thermochromic Tech-nologies for Ar-chitectural and Transportation Applications: Global Market Analysis and Forecasts. The firm's energy-performance projec-tions indicate that smart glass will see significant gains over typical high-efficiency, low-emissivity glass within the next decade, and adoption levels will grow as prices for the new technology drop and supplies increase.

There are three types of smart glass, which can be used in both the construction and transportation fields: electrochromic, suspended par-ticle, and thermochromic. "Usually what people are referring to when they refer to smart glass, is actually electrochromic glass," says Eric Bloom, a senior research analyst for Navigant Research in London and a coauthor of the study. "When a charge is applied to the glass there is a change in opacity, so it can go from pretty much totally clear to pretty much totally dark, just by changing the voltage being applied." The charge changes the opacity of the glass by moving lithium ions between

The charge changes the opacity of the glass by moving lithium ions between two layers of film sandwiched between two layers of glass. Electrochromic glass offers the highest performance of each of the three types of smart glass, at a typical cost of $45 to $70 per square foot, Bloom says. Suspended particle glass typically costs about 20 percent more than electrochromic glass and works as it sounds, according to Bloom. Suspended particles located between two panes of glass are controlled through the application of a very low voltage. When the charge is applied, the particles reorient themselves to either let light through or block it.

Thermochromic glass—which has been around for some time, and is the concept behind the ubiquitous color-changing glasses popularized in the 1980s and 1990s—typically costs approximately $30 to $45 per square foot, he says. By comparison, low-emissivity glass typically costs between $5 and $15 per square foot.

The volume of smart glass sold globally is expected to grow dramatically, from a very low volume this year to up to just over 2.7 million m2 by 2022. (Navigant Research). "So comparing it, $5 to $15 a square foot versus $45 to $70 a square foot—it's quite a jump," Bloom says. "But, having said that, the costs are coming down pretty rapidly." As manufacturing processes scale up over the next decade, Bloom predicts that the costs of smart glass will drop by approximately 40 percent. In the last two years alone, he points out, the market has effectively transitioned from "science projects to reality," which is the first step in moving away from research and development toward full-scale production.

P ELAVARASAN (11BCE012)

ASSOCIATION ACTIVITIES

**Inauguration of Civil Engineering Association "Beavers"
& lecture on "Industry Expectations from Civil Engineers"**

**Er. SP. Ramaswamy
Head of Engineering, Appaswamy Real Estates, Chennai**

Student Talent Enhancement Program(STEP) for I years

- **Mr. S. Chandra Kumar,**
- **Mr.S.Sivalingam,**
- **Mr. G. Ganesh,**
- **Mr. D. Rajkumar**
- **Mr.E.Venkatachalam**

Student Talent Enhancement Program(STEP) for II years

- **Mr.S.Pitchiya,**
- **Mr.T.Ragavendran,**
- **Mr.R.Udhaya Kumar**

Solar Windows on the Willis Tower

Pythagoras Solar undertakes a pilot project to install solar windows on the Willis Tower (formerly the Sears Tower) in Chicago. The project should provide data on the potential use of glass facades to collect solar energy.

Pythagoras Solar is conducting an experiment on one of the most iconic structures in the world – the Sears Tower, now Willis Tower. Established in 2007, Pythagoras specializes in solar panels for windows, focusing particularly on skyscrapers and other tall buildings. Skyscrapers have little rooftop area to accommodate solar collectors but use an extensive amount of glass use in their facades. These expanses of glass result in astronomical heating and cooling costs. Skyscrapers also contribute to a localized retention of heat known as urban heat island (UHI) effect, and large cities such as Chicago are looking for ways to mitigate that heat retention. A two square foot section of windows were replaced on the south side of the 56th floor of the Willis Tower in November 2010. In their place are high-tech solar windows, double-paned with photovoltaic cells sandwiched between the panes. The photovoltaic cells are monocrystalline, which offers the highest efficiency rating – 17% efficiency versus 10% for polycrystalline. Each glass unit contains an internal plastic reflective prism that redirects sunlight onto the solar cell while still admitting natural light into the building. The solar cells work individually rather than as a series, something not usually found in photovoltaic cells. The windows were designed like louvered windows in that they don't interrupt views and natural light but reduce glare and overheating.

Shading is a concern, especially on the lower levels of the Willis Tower. American Landmark Properties, the owners of the Willis Tower, conducted a study that showed that very few parts would not catch at least some sun. Despite the solar panels' location on the south face of an immobile structure, they will still work at 14.1% efficiency. Capable of generating 120 watts of power, Pythagoras Solar's windows should produce the same amount of energy as rooftop-mounted solar panels. If they can work on the south face, perhaps they can work anywhere. Such a success could indicate that building integrated photovoltaic (BIPV) systems are practical, saving energy and cooling costs and reducing urban heat island (UHI) effect. John Huston, Executive Vice President of American Landmark Properties, relays that if the Pythagoras Solar experiment is successful then the entire south face will be tested, then the rest of the faces. Overall, the cells could possibly generate two megawatts of power.

Completed on May 3, 1973, the Sears Tower stood as the world's tallest building at 1,450' (110 stories) for 25 years before the Petronas Twin Towers in Malaysia were built. The building was constructed of steel columns and beams by using a "mega-module" system. Originally the building was designed for the Sears, Roebuck and Company by the architectural firm Skidmore, Owings & Merrill (now SOM). In 2009, the Willis Group Holdings of London insurance agency made an agreement to lease 140,000 sq. ft. as long as they were given naming rights. On July 16, 2009 the Sears Tower was officially renamed the Willis Tower. Today, the Willis Tower remains the tallest building in the western hemisphere and is one of the top 10 tallest buildings in the world. It still has the highest skydeck in the world, located on the 103rd floor, at an elevation of 1,353', not to mention that it has a world-class broadcast platform on the rooftop – the antennas alone add nearly 300' in height and broadcast to the entire Chicago area.

S MELVIN (11BCE028)

Faculty Contribution

Dr. G. Jaisankar. Prof. and Head Dept. of Civil Engg. Mr. S. Krishna Kumar. AP/ Civil	“Teaching Learning Series Seminar”
Dr. G. Jaisankar. Prof. and Head Dept. of Civil Engg.	International Conference on “Energy Technology, Power Engineering and Environmental Sustainability”.
Mr. S. Krishna Kumar. AP/ Civil Mrs.C.Latha AP(SS)/Civil	“Mechanics of Solids” House Planning and Management
Mr.A.Manikandan AP/Civil Dr.G.Jaisankar, HOD / Civil	"National Conference on PM – The Engine to Drive Transformation
Mr.S.Syed Masoodhu AP / Civil Mr.K.Vignesh AP / Civil Ms.M.Ranjitham AP / Civil	"International Conference on "Emerging Environmental & Advanced Oxidation Technologies for Energy, Environment and Sustainability (EEAOTEES-2014)"
Mrs.R.Chandra Devi AP (SS)	International Conference on “Green Technology for Environmental Pollution Prevention and Control (ICGTEPC - 2014)’
Mr.L.Lokesh AP / Civil	One Day Post Conference Workshop on Advanced Oxidation Technology - Skill Training and Demonstration (AOT-2014) Indo- US Workshop on Pile Foundation Mission 10X Faculty Empowerment Work-

Mrs.R.Chandra Devi
AP (SS) / Civil

The History of Activated Sludge

Ardern and Lockett, who invented the activated sludge process, first used the term, activated sludge, in 1914. Their discovery of the value of recycling biological solids in aerobic wastewater treatment led to the activated sludge process, now the most widely used biological treatment process.

On April 3, 1914, at a meeting of the Society of Chemical Industry at the Grand Hotel in Manchester, England, Edward Ardern, MSc and William T. Lockett, MSc, presented their classic paper, "Experiments on the Oxidation of Sewage Without the Aid of Filters," which was later published in the Journal of the Society of Chemical Industry1.

In this paper, Ardern and Lockett described all of the essential components of the activated sludge wastewater treatment process, as it is used today, and as it rapidly became the most widely used biological wastewater treatment process. In this paper, they made the first reported use of the term "activated sludge" to refer to biological solids that they settled out of aerated wastewater and recycled back into the treatment processEssentials of the Activated Sludge Process
The essentials of the activated sludge process, which were described in Ardern and Lockett's paper (and are still in use today), are

Activated sludge
aeration of wastewater in the presence of aerobic microorganisms
removal of biological solids from the wastewater by sedimentation
recycling of the settled biological solids back into the aerated wastewater
This set of processes favors aerobic microorganisms that flocculate to form settleable solids that can be removed by sedimentation and sent back into the aeration process, while allowing non-settleable aerobic microorganisms to wash out of the system. Thus a concentrated culture of aerobic microorganisms can be maintained in the aeration tank, so that the organic matter in the incoming wastewater will be oxidized to carbon dioxide and water with a manageable hydraulic residence time (and thus a reasonable tank volume).Activated sludge is one type of biological wastewater treatment, a type of treatment that functions by bringing wastewater containing waste organic matter in contact with aerobic microorganisms and oxygen, thus causing biological oxidation of the waste organic matter and removal of biochemical oxygen demand from the wastewater.

Wastewater Treatment Prior to 1914
In the first half of the nineteenth century, the use of sanitary sewer systems in cities was just emerging in Europe and the U.S. as an alternative to pit privies, ditches, dumping chamber pots into the street, or cesspits. The sewer systems typically simply conveyed the wastewater for discharge into a body of water. By the mid-1800s, the relationship between wastewater and water supply in the spread of waterborne diseases became clear,

K SANTHIYA (13BCE016)
SAI ELAKKIYA 913BCE027)

When Stress Is Bad: Forensic Structural Engineering

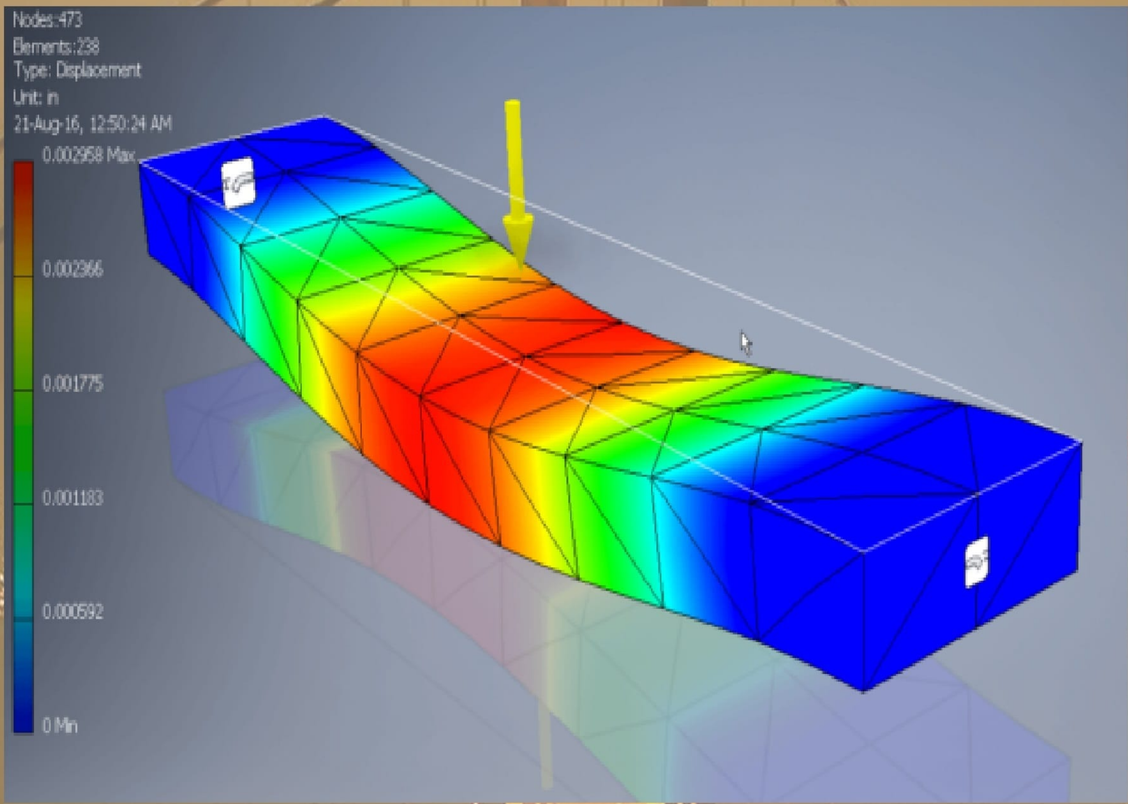
Collecting facts to recreate the scene of a crime has been a fascinating fictional story plot long before Sherlock Holmes became popular. In reality, the investigating detective may not work in law enforcement but instead, work in the extremely interesting field of forensic engineering. And the case may not necessarily involve criminal activities although many such cases arise. Instead the investigator may simply be determining the cause of failure in order to improve materials, designs, and intended use of an engineered product or structure.

One of the first applications of structural failure analysis may have been developed by the early engineers of the Roman Empire. As the story goes, engineers who built arches were expected to stand beneath the completed construction as the supporting formwork was removed. If the structure held together properly, the engineer lived to begin the next project. If the structure collapsed, the surviving engineers and apprentices presumably gained valuable insight on how bad design, materials, workmanship, and/or overloading affect structural performance.

The incident initiated a review process which is generally followed by forensic engineers to this day: an investigation was performed by a lead engineer who examined the site of the failure, collected materials, performed testing and analyses, reviewed witness statements, recreated events, and formulated a report attributing causation of the structural failure. And like modern investigations today, the failure analysis was not conclusive, but was able to determine probable cause. The design was deemed defective allowing fatigue failure of a cast iron beam, exacerbated from the weight of the extra ballast which had been applied only a few hours prior to the collapse. The wrought iron supports did not strengthen the structure as intended due their poor design implementation in the structure. Testing of the materials showed cast and wrought iron was prone to fatigue cracking failure, calling into question its use on other bridges and structures. Finally, continued failure of bridges and other structures using cast and wrought iron led to the development of high strength steels and other alternative materials.

Forensic engineering has come a long way since those early days. Professional associations, advanced degrees, certifications, and consulting services abound. Vaster understanding of material properties and usage has led to better engineering design. Dedicated laboratories and computer simulations have become highly developed tools to analyze material and system failures. Tragically, however, forensic engineering is still required for failures involving loss of life and limb.

When Stress Is Bad: Forensic Structural Engineering



Expert witness testimony is commonplace to determine criminal and civil liabilities. Strategically placed cameras and data recording systems can often capture failures as they occur, greatly reducing the uncertainty of conflicting eyewitness reports. And bridges still fall due to failed material and poor design, as the all too recent collapse of the I-35W overpass in Minnesota confirmed over 160 years after the Dee River bridge failure. Incredible as it may seem, the resulting 2008 NTSB report attributes the collapse to inappropriate addition of covering material dead load, in this case 2" of concrete overlays, and failed design of supporting members, in this case undersized gusset plates.

D MADHU MITHRA
(13BCE021)

CIVIL ENGINEERING ASSOCIATION

Mcet BEAVERS

Editorial Team
Mr.R.Manthiram @ Karthik (11BCE026)
Mrs.S.Syed Masoodhu
Assistant Professor,
Department of Civil Engineering

Dr. Mahalingam College of Engineering and Technology
Department of Civil Engineering