



PROJE FUARI 2013

INDUSTRIAL BUILDING PROJECT

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Due to its ductility, the structural engineering profession has been using the STEEL as a construction material. In Turkey, many buildings have been constructed in the area of (industrial) high seismic activities. These buildings are designed to resist lateral loads arising from earthquakes by old standards. (TDY 98) Industrial buildings have been made by using precast elements in 1990's widely. From the experience of the latest earthquakes most of precast buildings collapse or severe damaged. Beginning the 2000's, to avoid collapse and lose financial invest; steel structures became one of an issue. For this purpose, in this term project an industrial building in Sakarya is designed as steel structure. The building has a rectangular base in plan view having the area of 1470 m² and consisting of mezzanine floor which area is 164 m². The total height of the building is 9.85 m. The building is in the first earthquake zone and soil type assumed Z3. All loads are defined according to TS 498, TS 648 and Turkish Earthquake Code. Section moments, shear and normal forces are calculated SAP2000. In design of roofing and covering element, new steel cross section CEE profiles are used and they compare with Euro-profiles. At the end of study cost of structure is calculated.



PROJE FUARI 2013

**PILE FOUNDATION DESIGN
&
DEEP EXCAVATION SUPPORT SYSTEM**

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Day by day, construction sector is developing as the necessity of growing and changing world. In the direction of this necessity, heavy loaded buildings, huge dams, highways etc. are built .In order to carry to the high loads, and to build structures stand solid and safe against earthquakes, modern foundation systems are being developed. The major purpose of foundation system is to transfer structural loads to the ground safely. On the basis of this aim, most common foundation system which is pile foundations are applied.

In this study of the thesis, according to the boring experiments at the field, soil investigation report was prepared. While this report was preparing, besides field experiments such as SPT, laboratory experiments are also applied. As a result of the soil investigation report, pile foundation system was chosen with respect to economical and safety factors , and this system is surveyed with deep excavation. Initially, to calculate structural loads, 14 story building is designed with STA4CAD. According to structural loads, eccentricity, settlement are calculated. Then, pile section is chosen and pile calculations are solved with Plaxis2D.



PROJE FUARI 2013

**EFFECTS OF CONTINUOUS FRAME'S RATIO AND LOCATION AND USING OF SHEAR
WALLS TO STRUCTURE'S EARTQUAKE RESISTANCE**

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The earthquake is commonly occurrence and destructive disaster event. There are two main subjects which cause damages of buildings when the earthquake occurs. One of these causes is soil problems, another one is superstructure problems. These superstructure problems can be ordered as insufficiency of shear walls, continuous frame, condensation of confinement and low quality concrete.

In this study, the aim is examining and defining the importance of the location and ratio of continuous frame, using shear walls according to buildings' earthquake resistance. Besides it is purposed that finding effects of shear walls to construction cost. To begin with the study, thirty each projects which is still used in Eskişehir and collapsed at 1999 earthquake in İzmit and Adapazarı is examined. Then, continuous frame amount and location types are generally defined and six main different plan types is constituted. In the next step, according to the defined properties, models which has six floors and five each axis both x and y direction is generated. After these studies, the models are analyzed with STA4CAD program and period-displacement graphs are sketched. In conclusion of this study, it is seemed the buildings which have ordered continuous frames and shear walls have much more resistance under the seismic loads. Moreover, it is obvious that correct selection of the location and ratio increase this resistance more, using shear walls in building projects does not mean to increase cost of structure a lot.



PROJE FUARI 2013

**COPARISON OF ALTERNATIVE METHODS and PACKAGE PROGRAMS USED FOR
LINEAR and NON-LINEAR TIME HISTORY ANALYSIS IN FOUR BUILDINGS**

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Turkey is in earthquake zone that's why buildings in this country have major damages in their structural carrier system because of earthquakes happened last years. These damages are occurred because of three different major problems. First, one is project part, second one is not obeying of Turkish Earthquake Code (TEC) 2007 and the final part of these problems is construction part. In this study, four buildings, which have different architectural plan, floor number and structural reinforcement carrier system in Turkey are exposed to 1999 İzmit / Adapazarı Earthquake to determine their behavior under earthquake. Non-linear time history analysis is conducted using direct integration method by SAP2000 and linear time history analysis method applied by STA4CAD programs. Thus, floor displacements, periods, relative floor displacements, and maximum moments of the basement floor are found and interpreted according to TEC2007. In addition to this, results are compared with "AURO" scoring system that is developed from Anadolu University Institute of Earth and Space Science.



STEEL FIBER CONCRETE

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Traditional concrete used in reinforced concrete structure is a construction material which resists the compression stresses existing on members and shows brittle behavior at failure moment. However, traditional concrete has enough compression strength, its tensile strength is too low to be considered. For this reason, fiber admixtures, differing shapes and kinds, are used to increase tensile and bending strength of concrete. These fibers also contribute deformation capacity to concrete.

In this study, hooked steel fiber was used to determine the tensile and bending strength of concrete including steel fibers. The effect of steel fibers to the mechanical properties of concrete was investigated with experiments by changing the amount of the fibers. Effect of the steel fibers to the compression, tensile and bending strength of concrete was investigated. To compare the effect of steel fiber, a reference concrete sample was produced. Three different steel fiber ratio was added to unit volume of concrete by mass which are 0.5%, 1.5% and 2.5% and three different series concrete were produced. 3 beam samples with dimensions of 10x10x50cm, 3 cube samples with dimensions of 15x15x15cm and 6 cylinder samples with dimensions of 10x20cm exist in each series. Compression, splitting tensile and four-point-loading bending tests were performed on the reference and steel fiber concrete. All experiments were performed after the samples complete their curing process which is 21 days.

As results of experiments, steel fibers effect the consistence and workability of concrete negatively. Steel fibers improved splitting tensile and bending strength of concrete especially.



PROJE FUARI 2013

Investigation of Porsuk Reservoir Capacity for Future Water Demand

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The purpose of this study to investigate the capacity of Porsuk reservoir, which was built in 1972 for water demand of city of Eskişehir and its province, for future water use. For this purpose, meteorological data like precipitation, evaporation and inflow taken from State Hydraulic Works (DSİ) are used for the reservoir operation study. The water consumptions per capita calculated based on the population growth scenarios by several methods. The future agricultural water demand is used as constant for the following 40 years. Assuming that the meteorological conditions will be the same for 40 years the operation of the reservoir with estimated future municipal and irrigation water use the capacity of the reservoir is checked with a reservoir operation algorithm written in Microsoft Excel program. It is seen that the reservoir capacity till 2050 will be enough for usage according to scenario.



PROJE FUARI 2013

FIBROUS CONCRETE REINFORCEMENT

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In a growing and changing world, as a prospective civil engineer, our aim is to produce economic, sustainable, modern and safe structures. This necessity led us to produce concrete with different admixtures. The concept of using fibers as reinforcement is not new. Historically, horsehair was used in mortar and straw in mud bricks. In the 1900s, asbestos fibers were used in concrete. In the 1950s, the concept of composite material came into being and fiber-reinforced concrete was one of the topics of interest. Once the health risks associated with asbestos were discovered, there was a need to find a replacement for the substance in concrete and other building materials. By the 1960s, steel, glass (GFRC), and synthetic fibers such as polypropylene fibers were used in concrete. Research into new fiber-reinforced concretes continues today.

In this study, first, concrete samples without fiber concrete and with polypropylene, scrap tire fibers concrete were produced. Then these samples were matured in laboratory conditions. All samples tested in compressive test machine 3, 7 and 28th days strength properties are evaluated. In addition, samples tested in flexure test machine. On the other hand, in this thesis, concrete mixtures prepared with various animal natural hairs are examined for the comparison with fiber concrete mixture which prepared before.



PROJE FUARI 2013

**COMPARISON OF ALTERNATIVE METHODS AND PROGRAMS USED FOR LINEAR AND
NON-LINEAR TIME HISTORY ANALYSIS OF FOUR BUILDINGS**

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Turkey is in earthquake zone with many active fault lines so buildings seriously damaged in earthquakes. The most important causes of these damages are choosing wrong structural systems of buildings in project part, practices contrary to the Turkish Earthquake Code TEC 2007 and construction faults. In this study, three buildings that still exist in Eskişehir and one building in Izmit that destroyed in the earthquake of 17 August 1999 are selected. And then, the four reinforcement buildings which have different material, number of floor, architectural plan, and structural system are determined performance analysis with non-linear direct integration methods of Time History by Sap2000 and linear methods of Time History by Sta4Cad programs. 7. Part procedure of Turkish Earthquake Code TEC 2007 is used while determining performance of the buildings. Acceleration values of 17 August 1999 Duzce earthquake are used for time history analysis. Displacements, periods, moments ... etc. of the structures have been observed. These results are compared with each other and also - AURO- scoring system that is developed from Anadolu University Institute of Earth and Space Science. Hence, alternative performance analysis methods are applied with different programs to know how buildings behave during earthquake.



PROJE FUARI 2013

**INVESTIGATING DIFFERENT FIBERS FOR INCREASING THE DEFORMATION
CAPACITY OF CONCRETE BEAMS**

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Tensile strength of the concrete beam is as important as the compressive strength of the concrete beam. Improvements at concrete mix design criteria brings about the need to develop better performing and safer concrete beams. The need to improve the deformation capacity of concrete beams has led to several developments which include the use of fibers to improve concrete mix properties resulting in concrete mix design with increasing bending deformation capacity.

Fiber reinforced concrete is increasingly being used day by day as a structural material. Different fibers such as steel, polypropylene, polyvinyl alcohol can be used to increase the deformation capacity of the concrete beams. This thesis investigated rheological and mechanical properties of two different steel fibers and polyvinyl alcohol fiber in concrete mix design at a volumetric percentage of 2%. Effect of different fibers was determined by flexural strength, compressive strength and ultrasonic pulse velocity (UPV) tests. With the obtained datum from these tests, comparison of the fibers was made in terms of suitability and efficiency for the concrete beam deformation increment.



PROJE FUARI 2013

**MULTI-STORY REINFORCED CONCRETE BUILDING DESIGN, STATIC AND COST
ANALYSIS**

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Earthquake is one of the largest disasters which gives rise to the loss of life and property of a large number in Turkey and should be taken seriously but it has not been under the pretext of economic concerns in today's conditions. For this reason, the design of earthquake resistant buildings carrier system has become the most important areas of civil engineering design. As a result of repetitive structures companies expect different designs for marketing, but the most important matter need to be focused on unsafe buildings are built by civil engineers with economic concern. Taking this into account in the stages of the final project, an "Application Project" has been selected as an acceptable design in Architecture Department. In my project, I created the carrier system by changing architecture's concern of esthetic in a minimum level. Due to the high-rise building (to be specified in the Regulation of Planned Development Areas Type of construction high rise building has been identified as 10-floors or more) it is necessary to reduce the horizontal displacements increased seismic loads that affect the structure and second degree moments. For that, solution is provided with shear wall continuing from the foundation. In order to decrease the load of the building as well as provide thermal insulation YTONG has been used in the wall. Basic types of mat foundations have been selected according to load of the building and soil pressure. The

minimum cross-section values have been considered according to TDY2007 and TS500 regulations to be complied with by the precision of "High-rise buildings in the right place, the right construction material should be safely built by selecting". STA4CAD package software was used for the analysis of reinforced concrete under static and structural system. In the analysis of the first stage, building materials were introduced and have been selected as structural system software. In order to create a structure according to results of the analysis capabilities provided sections has been tested and secure adequate measures on behalf of selected sections. Following the selection of the structural system and the irregularity of the displacement of the structure were analyzed utilizing the reports of the earthquake. Calculations by hand and comparisons are made with the CSI software with confidence in the international market when they are considered necessary. Results and the necessary drawings have been obtained from the program. Then, form, concrete, reinforcement, walls, tiles, leveling concrete, hardwood flooring, roof, paint and plaster structure quantity survey are calculated using the cost-to-date unit prices through projects.



PROJE FUARI 2013

FLOW HYDRORAPH ANALYSIS WITH USING HEC – HMS SOFTWARE

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In this study, Kurukavak basin which is 3rd degree lower order basin of Orta Sakarya basin is examined. Basin has 4,25 m² area. Precipitation and flow data between 1990-1991 used for analyze the basin with using Hec-HMS software package. SCS unit hydrograph method which is an included part of Hec-HMS is used. Hydrograph obtained by modeling losses, flow, rainfall after the precipitation. Parameters which used for modeling are rain flow, curve number, initial abstract. After the analysis, monthly flow hydrograph and monthly observed flow hydrograph compared. With using the software analysis, founded values are closed to each other. Additionally, Pearson correlation statistics analyze method applied , monthly observed and calculated values are examined. Accuracy percentage between these two values is acceptable. That result shows, annual flow prediction can be made by using Hec-HMS software.



PROJE FUARI 2013

**ANALYSIS OF CHARACTERISTICS IN SEYHAN BASIN USING ARCGIS AND SATELLITE
IMAGES (MODIS)**

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Water is the source of life for every living creature on earth and management of water resources is the most important subject for a nation to survive. Water demand is increasing day by day due to increasing population. This situation unleashes the need of a good planning on the management of water resources. Since Turkey does not have a water rich geography in this project it is tried to find out the water potential of Tutak Subbasin of Firat Basin.

The monthly maximum, average and minimum temperature, days covered with snow, evaporation and precipitation data taken from the meteorological stations which have been recorded monthly since the early 1970's, are processed. On the other hand the flow data that are also taken from the stations on the basin are analyzed and it has been tried to understand the water potential of the subbasin. Since the days covered with snow and flow data are overlapping logically it is clarified that this subbasin is fed by snow.

Furthermore, the topologic of subbasin is analyzed by ArcGIS Software as maps such as slope, aspect, elevation, etc. Moreover it has been determined the areas covered with snow by the help of the data Captured by Modis Optical Satellite.

As a conclusion the subbasin is analyzed for the purpose of Water Potential. The obtained data can be used as a rough database for a probable hydrological or hydrological modeling on the basin. On the other hand this data can be used for estimation for management of a probable water structure that can be build on the basin.



PROJE FUARI 2013

FLOOD ANALYSIS OF SAKARYA RIVER USING HEC-RAS AND REHABILITATION

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Settlement increases near the regions where water resources effectiveness in agriculture and easier for transportation. On the other hand, floods which occur in these regions affect the socio-economic life and cause repairable or residual damages. Hence, flood analysis and management is getting important nowadays. The aim of this study is to determine the potential floodplain and suggest protection and/or rehabilitation tools to prevent the damage due to flood in a selected region of Sakarya River. HEC-RAS river analysis program is used in this study. HEC-RAS is one of the well-known programs which are used for analysis, data storage and management in river modeling. Two important data are needed as input in analysis; geometric data and hydrologic data. In this study, geometric data includes 14 cross-sections provided by State Hydraulic Works. Flood discharges associated with return periods of 10, 100, 500, 1000-year are used as hydrologic data. Water surface elevations are observed by evaluating different scenarios on the existing floodplain and rehabilitation and flood capacity improvements are suggested according to water surface elevations.



PROJE FUARI 2013

**IMPROVING THE HIGH HEAT and FIRE RESISTANCE of CONCRETES BY SLAG
ADDITION**

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Concrete and concrete-made structures are highly susceptible to the high heat and fire exposures. As a composite material , concrete is composed of cement ,aggregate and water. In the case of high heat and fire conditions, the mix water , which is not results in any chemical reaction with cement,evaporates and creates a vapor pressure in concrete. This vapor pressure causes a change in the internal structure of a concrete by creating minor and major cracks. Also , cracks result in decreasing the compression and tension strength to the half of the original strenghts of concretes and concrete-made structures.

In this academic study, it is aimed to produce the high-heat resistant concretes by including two different slag types in concrete mix design ; which are “Granular High Blast Furnace Slag (GHBFS) “ and “Steel-Making Slag (SMS) “. GHBFS and SMS play a binder property in concrete if they are finely ground to the 2400-2500 cm²/gram. By grinding GHBFS and SMS up to this fineness and including them in concrete mix as a portion of cement , it has been seen that the loss of strength of concretes are decreasing up to 30-40% when concrete expose to the high heats (>300 C). In the laboratory stage of this study, six different types of 10x10x10 cm sizes concrete samples are prepared in different slag and cement contents for a fixed water/cement ratios. Slag additions are

ranging from the amount of %0 to %50 of the total cement content with “ Portland Cement-42.5 (PÇ-42.5) . Also , to simulate the real fire conditions , samples are exposed to 20 C ,400 C and 600 C heats. As a result of the heat exposures, the decrease in the loss of strengths and the decrease in expansion cracks are reported thanks to GBHFS and SMS.



PROJE FUARI 2013

INNOVATION IN CONSTRUCTION INDUSTRY

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The purpose of this thesis is researching importance of innovation in construction industry. The world is developing day by day, needs of people are increasing. Hence, companies and all industries should be adopted to ages requirements. Especially construction industry is one of the biggest industries .Construction firms should innovate their services and equipments to move forward their success and performance. In this study, I examined relation between innovation and construction industry . I prepared a questionnaires and I interviewed with 30 civil engineers, architect or business owners. Answers of survey were entered to SPSS and analyzed.



PROJE FUARI 2013

**COMPARATIVE STUDY ON THE SEISMIC RESPONSE OF FIXED BASE AND BASE
ISOLATED HOSPITAL BUILDING**

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Seismic base isolation systems are product of the modern technology developed in order to isolate the structures from seismic hazards. Contrary to the traditional methods which have the aim to increase the earthquake resistance of the structures, these systems are based on reducing the effects of earthquake forces by shifting the natural period of the structure. In this thesis, response of seismic base isolation systems, which are used in reinforced concrete structures, due to seismic effects are investigated. To demonstrate the efficiency of isolation systems, Erzurum Public Hospital, is modeled as fixed based initially and then base isolation systems are applied at the basement level of the building. Time history analyses are performed for both two structural systems by using acceleration records of the Erzincan Earthquake. Floor displacements, floor accelerations, story shear forces, and story drift ratios of both analytical models are compared. Other than the Erzincan Earthquake ground motion record, seven different bi-axial earthquake ground motion data are selected in accordance with the Turkish Earthquake Code (TEC) 2007, 2.9 Analysis Methods in Time History calculations. The analyses are repeated for seven ground motions and for the two buildings. The mean displacements are compared according to the analyses results. Finally, it is concluded that the seismic isolators reduce floor acceleration, story drift ratios of the floors and shear forces in the investigated building which may result from earthquakes.



PROJE FUARI 2013

**THE INVESTIGATION EFFECT OF THE PHYSICAL PROPERTIES OF CONCRETE
CARBONATION**

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Carbonation is a layer hardening close to the surface where the the surfaces of reinforced concrete structures exposed to the atmosphere of carbon dioxide in the environment (CO_2) as a result of diffusion to concrete. Carbonation of the concrete surface, the atmosphere of carbon dioxide from the concrete in the voids of the free calcium hydroxide ($\text{Ca}(\text{OH})_2$) by reaction with calcium carbonate (CaCO_3), occurs by the conversion. Reacting carbon dioxide with calcium hydroxide dissolved in concrete with $\text{Ca}(\text{OH})_2$ concentration is reduced and the surface pH of the concrete. Thus, a hard layer occurs in the region of carbonation occurred.

In this study investigated the effects of physical and mechanical properties of concrete carbonation of concrete. For this purpose experiments were conducted on the core samples taken which have the different building/concrete age buildings in Eskişehir. Carbonation of the samples was determined by chemical method using phenolphthalein indicator. Each core sample to a depth of carbonation of the samples in cutting machine, were obtained by cutting carbonitised and non-carbonation. Some tests were carried out on this samples which are capillary permeability, water absorption, specific gravity, and pressure tests.

As a result of experiments, the different age structures of the different core samples was determined depths of carbonation. The carbonation of concrete physical properties and compressive strength caused a slight increase was observed.



PROJE FUARI 2013

**PRODUCING ELECTRICITY FROM AN INDUSTRIAL FACILITY'S VENTILATION
SYSTEM**

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Clean and sustainable energy is becoming more important for human life and protection of environment, our world. This project is based on producing clean energy in a facility's ventilation system, using wind power technology, from the air flow inside the ventilation pipes. The facility is a lead recycling factory located in Kümbet Akpınar Köyü, Eskişehir and has a high flow rate of air ventilation system. The problem statement was whether electricity can be produced in this system, using some of the energy otherwise being wasted, so the facility can use it for other purposes.

Literature survey showed that there are very few or none similar design exists with such purpose of use.

Collected data from the facility showed that the flow rate in the air ducts might be suitable for producing electricity which is totally 60000 m³/hour operating in 100% capacity. At these given flow rates, utilizing the Venturi Concept, with certain contractions in the air pipe cross section for increasing the flow velocity, considerable amount of power might be harvested.

In the design part, fundamental fluid mechanics principles were used and it is planned to place one or more Darrieus type, vertical axis air turbine inside the pipe, a

suitable power generator on top of the turbine outside of the pipe and an inverter to change the properties of the energy that is produced for industrial use. It is anticipated that the proposed system will be a great example of a sustainable and clean energy policy for industrial facilities.



PROJE FUARI 2013

AERATED CONCRETE

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Aerated concrete is a structural material which is composed to cement, silica sand, lime, water and in addition to those aluminum solutions which increases the volume and hardens the concrete with auto clave.

Aerated concrete has been patented by Sweden for the first time and designed in city of Yxhult. In Turkey, aerated concrete was produced in 1960.

The large part of the volume of aerated concrete is consist of air pores. It provides a reduction of structural dead load, compared to the others (brick and concrete) because it provides reduction of earthquake load. Also aerated concrete is effective for heat and sound insulation.

In this study, aerated concrete's materials and methods of producing aerated concrete are explained. In addition to that fly ash and slag are used instead of 50 percent of silica sand and the differences are compared between water absorption, compression and ultra sound transmission values with experiments.



PROJE FUARI 2013

**QUANTIFYING THE STRENGTH VARIATION
IN A CONCRETE ELEMENT**

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Compressive strength is one of the most important properties of concrete. Knowledge of the compressive strength is indicative of the concrete quality and other properties of concrete, such as durability, permeability, porosity, and volume stability. In this study, the main aim is investigating and quantifying the strength variation in a laboratory cast beam and discussing the possible factors causing the observed phenomenon. A simple method is presented for the determination of an equivalent specified strength of concrete, using a large number of core tests with different length-to-diameter ratio and core samples have been selected from different regions top, middle and bottom to specify the effects of core samples on compressive strength. In addition, a number of different types of concrete were used. The results from the deterministic approach in this study are expected to provide a better understanding of the variability in compressive strength, particularly for the considerably high departures of compressive strength from the expected values.



PROJE FUARI 2013

**PILE FOUNDATION DESIGN
& DEEP EXCAVATION SUPPORT SYSTEM**

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As the construction industry has been developed rapidly in recent years, significance of the soil problems where structures are built and modern foundation systems are started taking into account to build safer living spaces. One of the most commonly used foundation system is the pile foundations. Although it is not a new foundation system, in our country it has been built in the last quarter of century. Besides; ground improvement methods become widespread in Turkey day by day since our lands are located on wide seismic zone.

In this study of thesis, firstly soil investigation report was prepared in the first semester and according to that foundation type had chosen as pile foundation to transfer the load to the firm soil safely through the inconvenient ground. Within this study bearing capacities of piles of different diameters are estimated and the most economical and safer size had chosen. Later on, STA4CAD used to determine the axial load of 15-floor building and it's eccentricity. Then piles are located under the mat foundation to eliminate the eccentricity of the structure. Furthermore in the project , PLAXIS-2D is used to retrieve pile calculations.



PROJE FUARI 2013

**PILE FOUNDATION DESIGN AND
DEEP EXCAVATION SUPPORT SYSTEM**

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In Turkey, consequence of the 17 August 1999 earthquake, we understand that, base of the destroyed structure's problem. And after we saw that, ground of the demolished structures, generally have weak bearing capacity.

Clearly understood important of the soil improvement with these informations. In this license thesis, firstly made the deep excavation. Taked the sample from land and done laboratory test, prepared ground studies and geotechnical report. In this geotechnical report, choosed the pile improvement as a soil improvement.

Pile fondations are type of deep foundations which have the structure load carried to deeper layer of soil. Shallow foundations were considered to build with desired settlement and allowable bearing capacity, but these parameters of soil are not adequate. Deep foundations are preffered by that reason.

This informations ar efor anchored pile which is one of developed supporting systems to protect surface stability of deep excavation.

The chosen systems are analyzed with STA4 CAD v13.1 and Plaxis 2D v8.2 programs and comparison of the results are done with these informations and projections.

The soil investigation was prepared for the 2 Eylül Campus and the pile foundation was designed for a building that Eskişehir.



PROJE FUARI 2013

**PILE FOUNDATION DESIGN &
DEEP EXCAVATION SUPPORT SYSTEM**

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Soil is one of the most important elements of a structure. Turkey lands are located on wide seismic zone and according to the results obtained by analyzing the structures after recently earthquakes in Turkey, big percent of these structures main problem was soil problem.

In this thesis, firstly samples are taken in 2 Eylül Campus by boring wells and laboratory tests are done on these samples. Also investigation report has prepared according to these laboratory tests results. Later on, axial loads of 12-floor building are determined with the help of STA4CAD. Then bearing capacity of piles of different diameters are calculated with manual calculations and the most economical and safer diameter had chosen. Anchored pile system was chosen as deep excavation system. Moreover, The chosen system are analyzed with Plaxis 2D.



PROJE FUARI 2013

**CHARACTERIZING THE STRENGTH VARIATION IN A LABORATORY CAST BEAM
USING PROBABILISTIC METHODS**

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One important aspect of the concrete characteristics to practitioners and researchers is the difference in the compressive strength observed in one location compared to another within a concrete member of a structure.

In this thesis, beam samples which have different compressive stresses were prepared. From these beams, core samples were obtained with l/d values are less than 1. The aim of this study is to investigate the compressive strength variation with-in a laboratory cast beam and using the probabilistic methods. The results from this study are useful for characterizing the non-uniform spatial distribution of compressive strength with-in a concrete member. This information is particularly useful for more accurate structural analysis of concrete frame structures.



PROJE FUARI 2013

**EVALUATING THE EFFECT OF SHEAR WALL AREA TO FLOOR AREA RATIO
ON THE SEISMIC RESPONSE OF REINFORCED CONCRETE BUILDINGS**

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Shear wall that attracts a large amount of lateral forces, is a vertical structural member. It is an important structural member due to this feature. Two reinforced concrete buildings which are collapsed during the Duzce Earthquake are investigated. There were no sufficient shear walls in these buildings. It is a study that is done for determining shear wall area to floor area ratio in mid-rise reinforced concrete structures to prevent severe damage. Interstory and roof drift ratios are taken as a main parameter and Duzce Earthquake ground motion acceleration record is used in the analysis. Three and five story buildings that are demolished in Duzce, analyzed in nonlinear time history analysis by using Sap2000 and shear walls that have ratio varying between 0.0% and 2.5 % are arranged symmetrically in both principal axes by rules that are described in the (TEC) Turkish Earthquake Code 1975. Study results indicate that at least 1.5 % shear wall ratios for five stories building and 2.2% shear wall ratios for three stories building should be provided to keep stories drifts under control. In addition, it is observed that there is an increase in the seismic performance of buildings when shear wall ratios are increased over 1.5 % for five stories and 2.2 % for three stories.



PROJECT FAIR 2013

**SIX-STOREY REINFORCED CONCRETE SCHOOL BUILDING DESIGN,STATIC
CALCULATIONS**

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In this thesis, a six-storey reinforced concrete school building with 24 classrooms is analyzed. The structural conveyor system of the school building is determined based on the architectural planning and statically analyzed with the help of STA4CAD software package. These analyses are based on Turkish Standards 498, Turkish Standards 500 and 2007 Turkish Earthquake Code. The selection of conveyor system and the sizing of conveyor system elements gain importance because the factors of building importance and live load participation are high in school buildings. In addition to these factors, the safety of the structural conveyor system and economy are taken into account. The school building is designed not to collapse after a possible earthquake, therefore shear walls are generally used instead of columns. Moreover, irregularities are avoided as much as possible in the static project. For measuring the reliability, some results of software packages are manually calculated and interpreted. Structural element of the system shall be provided with sufficient stiffness, stability and strength to ensure an uninterrupted and safe transfer of seismic loads down to the foundation soil.



PROJE FUARI 2013

**EFFECT OF BITUMEN FILM THICKNESS ON PERFORMANCE CHARACTERISTICS OF
POROUS ASPHALT**

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Bitumen film thickness can be defined as the size of bitumen binder between the aggregates and mineral filler. Bitumen film thickness specifies the cohesion between the aggregate particles, therefore it affects most of the performance characteristics related with stability, rigidity and durability of hot-mix asphalt concrete. Effective asphalt content, surface area of aggregate and filler material affects the film thickness and also types of aggregate and filler material identifies the bitumen film thickness.

This study aims at determining optimum bitumen film thickness and the effect of different types of filler materials on asphalt film thickness. Relationship between filler materials and performance characteristics of porous asphalt concrete is presented. Indirect tensile strength test, Cantabro Abrasion Loss Test, Modified Lottman Test and Permanent deformation test is conducted on the Marshall Mix Design specimens with four different filler materials; stone dust, silica fume, fly ash and ethylene propylene diene monome(EPDM). Filler materials(particles retained on No. 200 sieve) is used as 2% and 4% by weight for each different types of filler.



PROJE FUARI 2013

ANALYSIS AND COMPARISON OF DATA OF BASIN OF ARAS

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Analyzing and interpreting of the data of a basin is extremely essential and profitable while designing or managing the water structure over this basin. Having an opinion about the potential water supply, available structure locations, suitable measurement tools' locations, relation between precipitation, snowing and runoff and forecasting of recent and future demands and supplies is the main and one of the most important part of the designing and managing process. By my this project, a sub-basin of the main basin of River Aras has been analyzed with terms of statistical and historical precipitation, snowy days, average-minimum-maximum temperatures values of the zone and the corresponding runoff that is occurred due to this events. By the help of the ArcGIS, all the hydrologic, hydraulic, and topographic analysis' and mapping transactions have been done. Data which has been obtained from General Directorate of Meteorology and other sources has been organized, reviewed and commented over. By the ongoing process, designing of a potential water structure over the basin is considered.



PROJE FUARI 2013

**DETERMINING AND ANALYSING CHARACTERISTICS IN SEYHAN BASIN USING GIS
(ARCGIS) AND SATELLITE IMAGES (MODIS)**

Buket MUTLU, Harun ILICAN

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Management of water resources is getting essential issue for future of society due to increasing of water demand per capita cause and increasing water pollution. Turkey does have sufficient water supply in order to compensate this demand. If the necessary precautions would not have been taken, water shortage would be indispensable for Turkey. Thus, management, planning, usage of water resources is a major fact . In this study, Zamanti and Göksu which are main tributaries of Seyhan River, called are examined.

Annual temperature, precipitation, snow covered days and evaporation data obtained from the meteorology stations are used for researches . In addition, flow data are used to determine the water resource potential. changing in precipitation and snow melt amount are identified statistically logical.

Seyhan Basin's elevation, aspect and slope characteristics are analyzed using ArcGIS software. Nevertheless, a hydrological studying is conducted with MODIS optical satellite image.

As a result, basin's characteristics of Seyhan are determined and analyzed. Obtained data can be used for hydrological and hydraulic modeling . Also, analyzed data provides information about management of existing or planned water structures in the basin.



PROJE FUARI 2013

**LEADERSHIP PROPERTIES/DIFFERENCES OF FEMALE-MALE
MANAGERS IN CONSTRUCTION SECTOR**

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The purpose of this study is to examine the probable differences between man and woman in general, the leadership behavior of man and woman in construction sector, and if there any, the differences between their leadership behavior.

In this report, on the literature part, varying definitions of leadership were classified and different leadership theories were examined. The historical development of working women in general was viewed. Women in management and women leadership in literature were examined. Some examples about leadership properties/differences of female-male managers in construction sector, were given from Turkey and the world. A study on the managers of construction sector was performed to analyze the leadership behavior of men and women managers, autocratic, bureaucratic, and democratic styles of women and men are examined. Leadership theories are investigated. Qualitative and quantitative research, properties, and methods are examined.

On the second part to understand the leadership styles of the manager civil engineer, architect etc, a questionnaire was surveyed, participants from 30 companies were interviewed for this study with proper questions; to understand the leadership behaviors of men and women managers. Results are obtained and analyzed by using the SPSS (Statistical Package for the Social Sciences) software.



PROJE FUARI 2013

BENCHMARKING IN CONSTRUCTION SECTOR

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Benchmarking is the one of the most effective management method in recent years. Aim of benchmarking is developing business progress and production quality institutions. During this improvement, comparison of work progress and production of different institutions is used.

In this thesis, the main purpose is; to determine the benchmarking applications of construction companies in the building sector. The knowledge and sources for benchmarking applications are examined by a survey. Analysis are performed using the SPSS program.



**ANALYSIS FLOW HYDROGRAPH BY USING ANNUAL PRECIPITATION AND FLOW
DATAS WITH HEC-HMS**

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Kurukavak basin which is sub-basin in 3. degree of middle Sakarya basin is chosen as the study area (4.25 km²). Also, on this study, precipitation and flow relationship has been found out with SCS unit hydrograph method in Hec-HMS by using 1990-1991 data belonging to Kurukavak Basin. In conclusion, flood hydrograph has been analysed. Hydrograph has been leads to The Hydrologic Modeling System (HEC-HMS) program which is modeling losses, direct flow and base flow of occurring after the rain. Hec-HMS model, flow values were found out by writing needed parameters (discharge of precipitation, current number, initial abstract etc.) and with SCS unit hydrograph method under circumstances of input data that is precipitation value. The hydrograph analysed at this model is compared with observed hydrograph. As a result of this comparison, The hydrograph which was analysed at this model have more greater value than observed hydrograph value was determined. In addition, the annual observed and calculated flow values was examined the relationship between of these values with using Pearson's correlation method of statistical analysis and percentage of trueness was lower. As a result, percentage of trueness has resulted in situation which is not done an estimated of annual flow with this program for this basin.



PROJE FUARI 2013

EFFECT OF CURING CONDITION ON FIBER CONCRETE ROADS

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Concrete roads are significant to heavily vehicles loads. As known there are a lot of heavily vehicle in our country. According to experiments, concrete roads more strenght than other pavement types. Thus, concrete roads should be develop in our country.

In this study have been worked on, curing condition on concrete roads and is worked to research the most conformable mix for the mixes of concrete roads. To experiments studies, have been prepared three type of concrete mixes which are used in concrete pure, polypropylene fiber and steel fiber.

Firstly, to supply site conditions concrete have been prepared out of the laboratory and the concrete was put in formwork has shape 1m x 1m x 0.15 m. Beside, the same concrete mixes have been put in cubic specimens (0.15m x 0.15m x 0.15m) on laboratory conditions. Taken core drilled has $\phi 10$ cm diameter from the formwork which out of the laboratory and hardened concrete experiments have been done on the core drilled specimens and cubic specimens. Surface hardness with Schimdt hammer, pulse velocity, compressive strength, concrete density, are tested on the examples.

It will be determined performance of concrete road mixes relations with fiber types and curing conditions from the experimental studies. Mechanical properties of the specimens are out of the laboratory and on the laboratory conditions will be compared.



PROJE FUARI 2013

PILE FOUNDATION and DEEP EXCAVATION

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After the analysis of heavy damaged and destroyed buildings, soil problems were identified in major of these buildings in the earthquake of 17 August 1999. Thus, one of the most important fact is ground. A structure which is wanted to build on inconveniently soil can be moved safely with deep excavation and improved soil with methods of ground improvement. With this study of thesis, according to the boring experiments at the field, the soil investigation report was prepared. While the soil investigation report was preparing, at the field experiment about soil mechanic was done such as SPT, at the lab experiments of soil mechanic were done such as unconfined compression-three axial compression-sieve analysis and hydrometer- Atterberg limits (LL-PL-PI) – consolidation - specific gravity - moisture content tests. In addition to these , suitable foundation of our construction was selected by using packet programs of Plaxis 2D, STA4 CAD.After all of these, pile foundation system was determined and located to the ground.

**JOB ACCIDENT IN CONSTRUCTION AND THEIR REFLECTIONS
IN THE MEDIA:
PROBLEMS AND SUGGESTIONS**

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This thesis focuses on job accidents in construction ,accident's reflections in the media and provide possible solutions for improving health and safety in construction. As a result of accidents, a lot of workers lose their lifes and big economic losses are occurred. The construction industry is the first line of work accidents list. In this study, suggestions of writers in the media about health and safety improvements are examined. Possible suggestions for reducing accidents are examined and illustrated in this study.



PROJE FUARI 2013

USE OF AIR-COOLED BLAST FURNACE SLAG AS AGGREGATE IN POROUS ASPHALT MIXTURE AND ANALYSING OF MODIFIED BITUMEN WITH EPDM RUBBER AND POLYPROPYLENE ON PERFORMANCE OF POROUS ASPHALT MIXTURES

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Porous asphalt mixtures have high coarse aggregate ratio. For this reason, stability, and durability characteristics required coarse aggregate. In this study, air-cooled blast furnace slag was investigated as aggregate. Primarily air-cooled blast furnace slag has been broken in accordance to porous asphalt mixture gradation. Polymer modified bitumen was used for preparation of porous asphalt mixtures and porous asphalt mixture has been prepared for air-cooled blast furnace slag. The results were compared with the design for basalt aggregate.

Bitumen has a significant impact in porous asphalt mixture. To improve the performance of bitumen, Ethylene Propylene Diene Monome (EPDM) and Polypropylene were added. Modification performances of Ethylene Propylene Diene Monome (EPDM) and Polypropylene in the mixture were analyzed. Bitumen was modified with EPDM and Polypropylene at respectively bitumen by weight 5%, 10%, 15% and 2%, 4%, 8%. Porous asphalt specimens were prepared by using the optimum bitumen. On specimens of porous asphalt Cantabro Abrasion Loss Test, Indirect Tensile Strength Test, Void Ratio, Permeability, Moisture Sensitivity and Permanent Deformation Test were carried out. According to the test results, effect of modified bitumen were examined.



PROJE FUARI 2013

**REFLECTION OF JOB ACCIDENTS IN CONSTRUCTION
IN THE HUMOR MEDIA**

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This thesis focuses on job accidents and health and safety and their reflections in the humor media. The construction industry has been recognized as one of the most dangerous sectors. It has a poor safety record. In this study the health and safety accident concept and accidents statistics are examined. In the main part, cartoons related with accidents are found by a documentary work. Finally, these cartoons are examined and necessary suggestions for the improvement of health and safety in construction are given.



PROJE FUARI 2013

FACTORS AFFECTING DELAY IN CONSTRUCTION PROJECTS

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This thesis focuses on factors affecting delays in construction projects. Construction is a very large and universal sector so there are a lot of factors causing delays. This thesis contains the most important factors and these factors are divided into groups. This study is very useful for construction projects finish on time. Additionally, three methods were examined to prepare the questionnaire such as ANP, AHP and SMART Methods. SMART method is used for the questionnaire. Participants from 30 companies were interviewed for the study. Data collected by the survey is analyzed by SPSS statistical software. According to the results, the most important factors causing delay in construction projects were identified.



PROJE FUARI 2013

**Freeze and Thaw Effects on Air Entrained and Non-air entrained Concrete with
CDF Test Method**

Myummyun NAIM

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And

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Cracks due to repeat freezing and thawing action on concrete have been investigated. This research created according to CDF Test method. The procedure of to measure the amount of scaling per unit surface area due to a number of well defined freezing and thawing cycles in the presence of deicing salt.

The experimental study of air entrained and non air entrained concrete specimens subjected to same cycle of freeze-thaw was completed. Types of specimens; normal concrete without any additive, concrete with silica fume and fly ash, high strength concrete. The weight loss, surface scaling, moisture uptake and internal damage were measured after 0 and after every 4th freeze-thaw cycle. The experiment results showed that the compressive strength decreased as the freeze-thaw repeated. The influences of freeze-thaw cycle on the mechanic property, weight lost and change surface texture.



PROJE FUARI 2013

**APPLICABILITY OF RIGID DIAPHRAGM CONSTRAINT ASSUMPTION IN
FIXED BASE AND BASE ISOLATED BUILDINGS WITH LARGE
OPENINGS**

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In this thesis, the applicability of the rigid diaphragm assumption in the analytical model of structures which have large floor openings is investigated. In order to investigate the effect of rigid diaphragm constraint on the structural behavior, Erzurum Public Hospital, is modeled as fixed base and seismic isolated separately with finite element method. Both models are first defined with rigid diaphragm assumption and in the second case slabs as shell elements are modeled instead of rigid diaphragms at floor levels. Time history analysis are performed with ground motion acceleration records of Erzincan Earthquake. Floor displacements, floor accelerations, story shear forces, and story drift ratios of both analytical models are compared. Other than the Erzincan Earthquake ground motion record, seven different bi-axial earthquake ground motion

data are selected in accordance with the Turkish Earthquake Code (TEC) 2007, 2.9 Analysis Methods in Time History calculations. The analyses are repeated for seven ground motions and for the two buildings. The mean displacements are compared according to the analyses results. Consequently; assumptions of rigid diaphragm is sufficient in base isolated systems although the structure have large openings. However; this assumption may lead to incorrect results in fixed base buildings with large openings. Therefore, rigid diaphragm constraint can be employed in the analytical modeling of base isolated structures with large openings.



PROJE FUARI 2013

DESIGN OF A DIVERSION WEIR WITH SIDEWISE INTAKE

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A diversion weir is a water raising structure built across on a river to raise the water level divert the desired discharge of water into the water transmission canals for various purposes, such as irrigation, hydropower generation, etc. Diversion weirs with sidewise intakes are the most common water raising structures on rivers in Turkey. They have many structural components designed for different purposes. In this thesis, components of the diversion weir with intake are designed step by step and static analyses are performed. Also, the river discharges are taken into consideration in order to dimension the structural components. In the first stage, intake structure is designed by taking the required irrigation discharge into account. Then, the rating curve is determined by HEC-RAS (River analysis system) program. After that, the water surface profile is calculated for the flood discharges with a return period of 100 years. The maximum height of water over the spillway is determined; therefore the spillway structure is designed. After determining the overall dimensions of the diversion weir structures, the stability analysis are checked against overturning, sliding and uplifting. In addition, bearing capacity and settlement of soil are determined.



PROJE FUARI 2013

DESIGNING A STEEL INDUSTRIAL ROOF SYSTEM BY CFS (Cold formed steel)

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Approximately, 90% of the warehouse and light industrial facilities constructed in Turkey during the 1990s used precast members. Structural damage and collapse of precast buildings was widely reported through out the epicentral regions of the 1999 earthquakes. From the beginning 2000, using steel for constructing industrial structures are became widespread. To overall purpose of design is to invent a structure which will satisfy the design requirements (effectiveness, safety and serviceability, economy and harmony). Steel exhibits desirable physical properties that makes it one of the most versatile structural material in use. Its great strength, light weight, ease of use and any other desirable properties makes it the material of choose for numerous structures.

In steel structures lateral loads are carried by either braces or moment resisting connection frames. In our project we used moment frames. The building mainly consists of columns, beams and, foundation. Load combos and ASD (allowable stress design) help us to find most critical loads, moments, deflections, etc. We used TS 498(Design loads for buildings) for loads affecting our structure and, TS 648(Building Code for Steel Structures) for design criteria to design structure. Firstly it was statically analyzed in the computer program called SAP2000. Then it was designed by hand calculations and, SAP2000 program, too. A design report was prepared. Cross sections were determined. The drawings were made in AutoCAD program.

In short, we designed one-storied steel industry building in Bilecik. Building height is 6.70 meters, frame interval is 8 meters and, length of building is 101.5 meters.



PROJE FUARI 2013

DETERMINING FLOOD LEVEL BY HEC-RAS

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Floods are events which need to take caution due to its harmful results .In this study we tried to analyze pilot in Sakarya to determine flood water surface levels . The data are provided by state Hydraulic Works. River cross section of Sakarya River are design in HEC-RAS making for the analysis. Flood discharge values for different return periods are provides as input to the program so differences on water surface profile are investigated. Besides differences on water surface levels are investigated in case of existence of bridges or culverts. The effects of different scenearios on water surface levels are evaluated by changing places of these bridges and culverts. Finally as a result of these analysis, water surface levels are investigated in different conditions at time of flood.



PROJE FUARI 2013

**LABRATORY STUDY ON MOISTURE DAMAGE OF STONE MASTIC ASPHALT
MIXTURE CONTAINING DIFFERENT FILLER MATERIALS**

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Moisture damage in an asphalt mixture can be defined as the loss of strength, stiffness and durability due to loosing adhesion between aggregate and bitumen by moisture .There are two different ways to reduce moisture damage and improve adhesion between aggregate and bitumen. One of them is modifying bitumen and the other one is increasing adhesion of aggregate surface.

In this study, the effects of EPDM(ethylene propylene diene monome), lime, fly ash and silica fume were studied to improve moisture resistance of SMA(stone mastic asphalt). One type of aggregate that has weak resistance to moisture damage, basalt, was evaluated during the course of this study and gradation of aggregate is chosen according to the SMA Technical Specification of Turkey General Directorate of Higways. Bitumen type is chosen as B50-70. Specimens of mixture is prepared as Superpave Design Method with Gyrotory compactor. There are four different filler materials that are lime, fly ash, silicafume and ethylene propylene diene monome (EPDM) used for improve moisture resistance of mixture instead of %2, %4 and %6 amount of filler. To determine the impacts of additives on moisture damage of hot mix asphalt using with the experiments of Modified Lottman Test (ASSTHO T-283), Nicholson Stripping Test (ASTM D1664-80), Repeated Loading Test (AASHTO T 322-03) and 5-Pulse Indirect Tensile Modulus Test (ASTM D4123).



PROJE FUARI 2013

**EFFECT OF SILICA FUME ON MECHANICAL PROPERTIES OF STEEL FIBER
CONCRETE**

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Concrete is a construction material most commonly used in the construction sector. In order to improve the properties of traditional concrete strength and weak in some admixtures used in the concrete. Steel fiber and silica fume is most commonly used among this admixtures. Steel Fiber is especially used for increasing tensile and bending strength and silica fume is used for achieving greater compressive strength. The main purpose of producing the fiber concrete intended to increase toughness, resistance to impact loading, bending strength and so on. The steel fiber especially provides a significant increase in ductility and toughness. Silica fume is a waste material produced in the factories of metal alloy although used in the construction industry due to the high pozzolanic enabled. Despite the many features to reduce improves the workability of the concrete.

In this study, silica fume's effects is investigated on mechanical properties of the hooked steel fiber concrete. For this purpose, the effect of mechanical properties of steel fiber concrete was investigated by using three different ratios of silica fume. Study, 0.5% and 2.5% by mass of concrete volume ratios in each participating steel fiber mixture, added 5%, 10% and 15% silica fume by weight of cement. Besides, 0.5% and 2.5% rates of

steel fiber reference concrete samples produced without silica fume. Each of series contain, 3 beam samples which are 10x10x50cm, 3 cube samples which are 15x15x15cm and 6 cylindrical samples which are 10x20cm. . All experiments applied on samples were produced after complete their curing process which is 21 days. These experiments are compression, splitting tensile and four-point bending tests.

As a result of the experiments, the workability of the concrete was decreased with increasing the proportion of silica fume. With the increase in the ratio of steel fiber mixtures of involved silica fume, compression, splitting tensile and bending resistance were increased.



PROJE FUARI 2013

**PERFORMANCE EVALUATION ON DIFFERENT
MODIFIED BITUMEN FOR MASTIC ASPHALT
APPLICATION IN ROAD PAVING**

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Pavement layer properties are as important as geometric standards of a road for in terms of safety. It is aimed to solve the problems which are encountered on pavement due to resist the effects of traffic and the environment. Therefore, many pavement types are discovered as a result of scientific studies. One of them is mastic asphalt. According to conventional pavement types, mastic asphalt include high bitumen content has many application areas. Void ratio was extremely small and because of waterproofing property this pavement type is widely used especially surface on bridge decks. It is suitable that the aging and stability against deformation as well as this property.

In the study, the effects of the polymer (SBS), polypropylene and EPDM (Ethylene Propylene Diene Monomer) modified bitumen was studied on the performance of mastic asphalt mixtures. Firstly, optimum bitumen content was determined with polymer modified bitumen and selected aggregate gradation. Then, indirect tensile strength, void

analysis, resilient modulus and permanent deformation tests were applied on the mastic asphalt specimens which was prepared with polypropylene (2%, 4% and 8% bitumen weight) and EPDM (5%, 10% and 15% bitumen weight) modified bitumen at optimum bitumen content. Finally, the effects of modified bitumen were compared by evaluating the results of experiments.



PROJE FUARI 2013

**DESIGNING A STEEL STRUCTURE WITH DEMONSTRATING THE NEW TYPE OF
PROFILES' STATICAL AND ECONOMICAL BENEFITS**

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The seismic design of building confuses the safety value of it. The traditional design methods have the objective of achieving life safety in the buildings by providing sufficient strength and ductility to resist total and/or partial collapse. Turkish and all other codes which are used to design reinforced and steel structures have the goal of life safety first.

After the 1999 Earthquake of Turkey, in society, the goal of limiting the excessive damage and maintaining the functionality of the building after an earthquake has been becoming more desired day after day. As a result of this steel structures have become more considerable because of their more ductile and lighter properties in comparison with reinforced structures.

Lightness of buildings provides a reduction in applied earthquake force and today by using new type profiles such as CEE and ZEE profiles, the light characteristic of steel structure can be turned into 50-65% lighter. This reduction is also possible in cost about 20-30%. In the project, an one story steel structure which is to be used as industrial building is designed with respect to Turkish Codes; TS648, TS498, Earthquake Regulations. Structural member profile assignment is done from regular section such as IPE, I and C steel profiles and also from new types; CEE and ZEE profiles to demonstrate the economical and statical benefits of new type profiles.



PROJE FUARI 2013

**HYDROLOGIC ANALYSIS IN BORABEY IRRIGATION POND BASIN USING
WATERSHED MODELING SYSTEM(WMS) AND HYDROLOGIC MODELLING(HEC-
HMS)**

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In this study, area north of the city of Eskişehir Borabey Irrigation Pond located on the slopes of Bozdag was chosen. Originally, Borabey that was allocated for use as Anadolu University Aquatics Center Pond, then was considered intended to be used to contribute to the Eskişehir's drinking water network. Watershead Modeling System(WMS) was used for hydrologic analysis. In the hydrologic analysis which was obtained Flow direction and Flow accumulation was determined the boundary of the basin, sub-basin , the geometric data (slope, perimeter, area, etc) was calculated lag time and time of concentration values . In the HEC-HMS, using the calculated lag time and time of concentration value and given different curve number were created scenarios in the Borabey Irrigation Pond Basin ,then using hypothetical SCS storm precipitation method was obtained unit hydrographs and peak discharges. In the Rational Method , using the runoff coefficients and Intensity-Duration-Frequency (IDF) Curves were created scenarios and were obtained unit hydrographs and peak discharges, then HEC-HMS and Rational Method were compered. As a result, the aim of this study with using the data obtained in study area will help in future when decide design water structure in this area.



PROJECT FAIR 2013

**FIVE-STOREY REINFORCED CONCRETE HOSPITAL BUILDING DESIGN,STATIC
CALCULATIONS**

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In this thesis, a five-storey reinforced concrete hospital building in Denizli is statically analyzed with the help of STA4CAD software package that are in accordant with Turkish Standards 498, Turkish Standards 500 and 2007 Turkish Earthquake Code. Since hospitals are required to be utilized after earthquakes, the building importance factor is high. Because of this importance, selecting structural conveyor system and conveyor system elements becomes crucial. Structural conveyor system is determined based on the architectural project without making big changes on the architectural plan. Conveyor system elements are sized according to the importance of the hospital. For safety structural conveyor system, shear walls are generally used instead of columns. Moreover, because of the irregularities, the hospital building is separated into two different dilatation areas. In static analysis, some results of software packages are double-checked with manual calculations and these results are concluded.



PROJE FUARI 2013

**PILE FOUNDATION WITH MAT DESIGN AND ANCHORAGED SHEET PILES IN DEEP
EXCAVATION**

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In this thesis, based on having current soil profile carry a structural load by using pile foundation with mat and a deep excavation system information about anchored sheet piles. Fact For building safe structure is before designing upper structure the soil behavior must be well known is the most important. Soil exploration is needed to understand the soil behavior. This study is done on an area of 490 m² of land for hotel construction. The samples are taken from land and laboratory experiments are performed in the ground survey report has been prepared. Alternative ground improvement methods are discussed. After the creation of the soil profile, designed the pile foundation with mat and sheet pile in deep excavation. For different diameter and lengths, calculation are done. After all design, it is simulated and checked it's safely with the widely used geotechnical software Plaxis and was cost estimation.