Vertical Displacements of Kömürhan Bridge [†]

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ABSTRACT

In this study, displacements and stress distribution under vertical loads of Kömürhan Bridge that is built by the balanced cantilever method for the first time in Turkey were determined. For this purpose ANSYS software is used and the real behaviour of the bridge is composed with finite elements model by taking into account the material properties and the boundary conditions. The main span of the Kömürhan Bridge is 143.50m, symmetric prestressed box section end supports of which are located on the shore. The displacements obtained by the finite elements model of the bridge and those measured at the cantilever end under the truck load are found to be very close. The displacements, normal and shear stresses were obtained for the model which represents the real behavior of the bridge under excessive loadings. Excessive displacements, normal and shear stress at the critical cross sections are important for the safety of the bridge.

Keywords: *Kömürhan, prestressed bridge, ANSYS, finite elements analysis, box girder.*

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Modelling Minor Approach Capacity of Unsignalized Intersections [†]

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ABSTRACT

Unsignalized intersections are effectively used in urban traffic management. Capacity calculation methods for unsignalized intersections' minor approach are usually based on analytical calculation methods. In this study, empirical capacity calculation equations are obtained by using a micro simulation program for different types of unsignalized intersections' minor approaches. Obtained empirical equations are compared with the models which are commonly used in literature and the applicability of the equations is determined.

Keywords: *Unsignalized intersection capacity, proportion of free vehicle, simulation.*

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Univariate and Cross Tabulation Analysis of Construction Accidents in the Aegean Region [†]

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ABSTRACT

It is crucial to investigate case studies and analyze accident statistics to establish safety and health culture in the construction industry, which exhibits high fatality rates. However, it is difficult to find reliable and accurate construction accidents data in Turkey due to inadequate accident reporting and recordkeeping system, which hinders statistical safety research. Therefore, an independent database was generated by using inspection reports in this research study. Data mining was performed within hundreds of accident reports in Aegean region between 2009 and 2010, and 185 construction accident cases were selected for univariate analysis and cross-tabulation. Results of the analyses showed that several variables demonstrated high risk, where safety improvement efforts could be focused on.

Keywords: *Construction safety, incident statistics, univariate analysis, cross-tabulation analysis.*

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Application of Various Methods for Consistency of Steel Fibre Reinforced Concrete and Relationships Between Them[†]

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ABSTRACT

Steel fibers are quite different from concrete components owing to the geometrical specialties. This difference causes some modifications in fresh concrete properties owing to steel fibers. This situation occurs as a result of decrease in workability. Inverted cone, and if it is not possible Ve-Be tests are proposed in standards for steel fiber concrete. These tests can only be conducted under laboratory conditions due to the inexperienced workers and difficulties in the construction site. For this reason relationships between conventional fluidity methods and the experiments proposed for steel fiber concrete but difficult to conduct in construction site owing to difficulties was investigated in this study. A relationship was tried to establish between Ve-Be test for steel fiber concrete, and slump and flow tests conducted in construction site. A relationship between workability and consistency of steel fibered concrete was examined as compared to fresh concrete tests.

Keywords: *Concrete, fiber concrete, workability, slump test.*

Modeling the Effects of Climate Change on Ikizcetepeler Inflows: 2015-2030 Projection[†]

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ABSTRACT

In the study presented, the impacts of climate change on flows were examined by a modeling based approach. The study has been carried out using climate forecasts of ECHAM5 circulation model simulated in the AR4 of the IPCC for Balikesir-İkizcetepeler watershed having Mediterranean climate characteristics. The future projections of precipitation and temperature changes on the studied area have been determined by downscaling the coarse A1B and 20C3M scenario results of ECHAM5 to monthly precipitation and temperature at basin scale. Following the statistical downscaling analyses, the downscaled scenario results have been transformed to runoff by means of a parametric hydrological model to assess the probable impacts of temperature and precipitation changes on runoff. According to the A1B climate scenario results of ECHAM5 climate model, approximately 23% decrease on İkizcetepeler runoff is foreseen with regard to 1960-1999 reference period statistics for the next 15-year period.

Keywords: *Climate change, ECHAM5, downscaling, hydrological model.*

Regional Flood Frequency Analysis of Eastern Black Sea Basin Based on L-Moments[†]

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ABSTRACT

In this study, a regional flood frequency analysis (RFFA) is applied to Eastern Black Sea Basin, Turkey. Homogeneity of the region is determined by both inconsistency (D_i) and heterogeneity measures (H_i) based on L-moments. Goodness of fit distribution test based on L-moments is used for the identification of the best distribution for the homogeneous region. Based on the appropriate distribution for the region, flood flows are estimated for the return periods of T=5, 10, 25, 50, 100, and 500 years. Regression models are developed for the estimation of design floods for ungauged catchments in the region. Drainage area, main stream slope, elevation, stream density, mean annual rainfall, and rainfall intensity values are used as independent variables in these models. Mean relative error, root mean square error, and mean absolute error values are applied to the model in order to evaluate the performance of the regression analysis. Best equations are obtained for estimation of flood discharges in the region.

Keywords: Flood frequency analysis, l-moments, Eastern Blacksea Basin.

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Code Requirements for Ultimate Stress Design[†]

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ABSTRACT

Turkish reinforced concrete and seismic codes enforce the use of "ultimate strength design" for the analysis and design of reinforced concrete cross-sections. In this paper, assumptions made for calculating the ultimate strength of sections under pure bending and combined bending in different codes are discussed. Ultimate moments obtained using the requirements of TS-500, ACI-318 and Eurocode 2 are compared.

Keywords: *Reinforced concrete, ultimate strength, simple and combined bending, high strength concrete, codes.*

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An Investigation on Properties of Transparent Concretes[†]

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ABSTRACT

Transparent concrete is a cement-based building material which has optical properties due to the embedded light transmitting elements within the conglomerate. In this study, the design of transparent concrete, its mechanical properties, light transmission properties of optical fibers and the use of optic fibers were discussed. The study was performed as a literature review, and it was focused on the light absorption of translucent concrete, transmission, the mechanism and losses in the transmission. Information was given about their strength, materials and proportions. As a result, it was determined that the illumination power consumption will be reduced by utilizing daylight as the light source in buildings by the use of transparent concrete. Moreover, it is seen that it provides architecturally aesthetic structures.

Keywords: *Transparent concrete, optical fiber, structural properties.*

Geotechnical Assessment of Compacted Sand Bentonite Mixtures to be Utilized in Underground Nuclear Waste Repositories and Barrier Design[†]

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ABSTRACT

This study assesses the mechanical and hydrological performance of compacted sand bentonite mixtures to be utilized in sealing underground nuclear waste repositories. In order to assess the performance of this material and to obtain an optimum sand bentonite mixture, a variety of laboratory tests, namely, compaction, falling head permeability, swelling, unconfined compression and shear strength tests were performed on sand bentonite mixtures possessing bentonite contents ranging from 5% to 15%. Sand bentonite barrier design was performed for the optimum seal selected as a function of the axial stress applied to the barrier and barrier length-to-radius ratio (L/a).

Keywords: *Sand bentonite mixture, nuclear waste disposal, barrier design.*

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Usage of Recycled Postconsumer Polypropylene in Bituminous Binder[†]

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ABSTRACT

Although waste polymers are economical materials, they are limited, in the case of a wide usage in highway application due to no chemical interaction between them and bituminous binders.

In this work, recycled polypropylene was exposed to gamma irradiation to form free radicals on the polymer surface. Five different samples of modified bitumen were prepared with the modifier content, wt. 1, 3, 5, 7 and 9% and binders were investigated in term of chemical and physical properties by means of FT-IR spectroscopy, florescent microscope, conventional tests, short and long term aging procedures, rotational viscosity, dynamic shear and bending beam rheometer tests.

Keywords: *Bitumen, recycled polypropylene, gamma irradiation, modification.*

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Night-Time Parking Behaviour Model for Istanbul[†]

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ABSTRACT

Parking is an inevitable part of car use. A car needs two parking spaces, one is for long duration, where it is parked after all daily errands or activities are carried out—this is around the residential location most of the time, and the other is for short duration while carrying out daily errands or pursuing activities. This paper shows that parking spaces are significantly affected by the urban development and vice versa, as experienced in the case of Istanbul. Carried out in a fast developing and motorizing city Istanbul, the study highlights perplexities of parking behavior when streets are regarded as de facto free parking spaces for privately owned vehicles and parking policies. A model, accounting for night-time parking location choice of households among three alternatives: On-street parking, Off-street private parking and Paid parking, is developed in this study. It is concluded that without controlling parking behavior and regulating land-use and transport policies, parking problems will reach a point of no solution under mass motorization.

Keywords: *Urban transportation, motorization, parking behavior, multinomial logit model.*

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The Prediction of Precipitations of Isparta Region By Using IDW and Kriging[†]

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ABSTRACT

The models on the long term mean rainfall estimations of Isparta region were produced in this study. The maps were formed according to estimation results of models. In modeling, Geographic Information Systems (GIS), Inverse Distance Weighting-IDW estimation method and Kriging Interpolation estimation methods were used. The results of predictions of both methods were compared and the results were evaluated. The evaluation results showed that the estimations and maps of IDW are better than those of Kriging method.

Keywords: *Geographic Information Systems (GIS), IDW, Kriging Interpolation Method.*

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Estimation of Global Solar Radiation: A Case Study of Gaziantep[†]

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ABSTRACT

In this study, the relationship between the global solar radiation and the meteorological variables (average temperature, relative humidity, wind velocity and vapor pressure) for limited data from 2000 to 2010 years obtained from the Gaziantep central meteorological observation station is estimated by that is using the genetics programming technique. The prediction results are compared with the observed ones statistically, and also based on their trend characteristics. The model comparison efforts revealed that linear genetic programming gave the best prediction results. It is believed that the derived genetic programming formulations can successfully be used in feasibility and design stage of solar power plants.

Keywords: *Global solar radiation, genetic programming, trend analysis, LOWESS.*

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A New Calculation Procedure for Signalized Roundabouts and Performance Analysis[†]

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ABSTRACT

Roundabout with signals is a common application in many countries. Although it is an emerging trend, design criteria are still ambiguous. On the other hand, performance of these types of intersections can only be measured by a number of simulation programs. Therefore it is an interesting topic for many researchers. In this study, primarily, signalized roundabouts are discussed and in particular, the relationship between the left-turning traffic volume and the intersection storage area and signal timing system is investigated. The effects of intersection design are evaluated regarding intersection type and phase plans and performance of design is measured by considering delays at intersections. The results show that, alternative intersection types can be preferred instead of roundabout with signals in case of increased left turns.

Keywords: *Traffic, intersection, signalized roundabouts, simulation, VISSIM.*

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Analysis of the 2007 and 2013 Droughts in Turkey by NOAH Hydrological Model[†]

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ABSTRACT

Analysis of drought, which is classified as a natural disaster, is globally assessed by the damage it gives. As a result detection of its characteristics is essential for understanding and reducing the effects of this natural disaster and for imminent prediction. In this study, soil moisture estimates obtained from NOAH hydrological model and normalized difference vegetation index obtained from MODIS observations are used to analize the recent droughts in Turkey. With the utilization of these parameters that are commonly used in drought studies, years 2000-2014 have been examined and a detailed analysis of the drought that occurred particularly in the years 2007, 2013 has been carried out.

Keywords: *NOAH, hydrological model, remote sensing, drought.*

The Investigation of The Effect of Lane Control Systems on Traffic Management[†]

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ABSTRACT

Traffic incidents are one of the major causes of traffic congestion requiring flexible traffic control methods. Lane control sistems (LCSs) are a form of traffic management technology for managing lane use on freeways. This is accomplished by posting speed limits or notices to vacate/change a lane on an electronic sign above each lane. In this study, the effectiveness of LCS and speed limit implementations is tested using 141 scenarios including different compliance rates, traffic demands and LCS locations in a single-blocked-lane incident case on a microsimulation model of a network in D100 Highway in Istanbul. The best scenario (LCS implementation only) decreased the average travel time by 16.76%, and increased the average speed by 20.19%.

***Keywords:** Lane control systems, intelligent transportation systems, incident management.*

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A Study for the Optimization of Construction and Operation Costs for Metro Systems[†]

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ABSTRACT

This article makes a brief reference to the Ph.D. dissertation by the author. Developing an approach for, calculating and offering the most appropriate solution to optimize a metro system's construction and operation costs. This includes different alternatives for passenger capacity, train sets, construction methods, etc. In order to optimize the construction and operation costs of a metro line, a software was developed in Microsoft Visual Studio with C# language by using object oriented programming approach. The software uses Big Bang-Big Crunch (BB-BC) algorithm for the optimization process. BB-BC Genetic Algorithm method and results of the Simulator X were used for the optimization. Finally the study also aims to offer a proposed software model which must meet the estimated transport demand for the target year, and also satisfies minimum construction and operating costs, with alternatives.

Keywords: Metro, construction costs, operating costs, optimization.

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