geologic units, where the pore sizes in the rock or soil units are too small to allow the introduction of conventional Portland cement suspensions. Due to successful experience in the utilization of chemical grouting over the last five decades, this method has been used for water sealing of part of the karkheh dam foundation, in one of the access galleries of the dam, named galleri 950. Two stages of chemical grout testing have been carried out to obtain some primary objectives of chemical grouting. In stage one of the chemical grout testing, which ended in the first half of Aban 1383, seven triangular holes, with a depth of five meters, were used, which were drilled in a conglomerate trench, near gallery 950. In stage two, which ended in late Esfand 1383, linear holes, with a space of about 1.8m and a depth of 60m, were used. These holes were drilled in gallery 950. The conditions existing at this stage of the chemical grouting were very near to the actual chemical grouting in gallery 950. Chemical grout testing in the Karkheh dam proved the efficiency of the chemical grouting method in seepage control, as well as resulting in valuable and unique experience, including design of a correct program for chemical grouting, mix design, solving execution problems and selection of a proper preparation and grouting system. In this paper, chemical grouting is briefly introduced, then, the results and experiences obtained from chemical grout testing in the Karkheh dam are presented.

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Abstract
In equivalent static method for earthquake resistant analysis and desing of structures, which is the simplest codified procedure, equivalent lateral load concept is utilized for determining the required strength and stiffness. Endurance Time (ET) is one of the newly developed analysis method that overcomes many of the limitations of satatic procedure and can be used for a more rational analysis of irregular and nonlinear structures. In this paper, application of ET method in analysis and design of steel frames has been investigated and results have been compared with the static procedure. One to twelve stories frames have been designed according to the static procedure and in the next step, are subjected to the special intensifying accelerograms that are calibrated with the code (standard 2800 of Iran) design spectra. The capability of the developed intensifying accelerograms in differentiating between strong, standard and weak designs is then investigated. Displacements and stresses at various locations in the frames have been calculated and compared to the target value. In general, the results verify acceptable precision and capability of ET method in predicting the static analysis results bye using a time-history based analysis.

COMPARISON OF LAX-WENDROFF AND NOC SCHEMES IN MODELING UNSTEADY TWO-LAYER EXCHANGE FLOWS THROUGH STRAITS

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Abstract
A comparison is made between the Lax-Wendroff and Non-Oscillatory Central (NOC) schemes in modeling unsteady two-layer hydraulic flows through straits. The model is used to study exchange flows forced by a periodic barotropic (tidal) flow. The model results are compared to previous laboratory and numerical experiments. A good agreement between the two schemes is found for both interface displacement and exchange flow rate. In general, the Lax-Wendroff scheme has less computational time and gives marginally better results than the NOC scheme in the laboratory case.

A FAST APPROXIMATE METHOD FOR CALCULATING THE COLLAPSE LOAD FACTOR OF PLANAR FRAMES

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Abstract
A simple and fast method is presented for calculating the collapse load factor of planar frames. For this purpose, the worst and, the best collapse mechanisms are considered, and using work and energy, two envelopes are constructed for the minimum and maximum work done by the internal resisting moments of the structure. The diagram for the external work done should naturally be positioned between the envelopes. Considering the loading and geometry of the structure, the curve for the external work of the structure is constructed. At the point where this curve crosses one of the envelopes, the structure will collapse and thus λ_c and the number of plastic hinges at collapse, can easily be obtained.

UTILIZATION OF CHEMICAL GROUTING FOR WATER SEALING OF PART OF KARKHEH DAM FOUNDATION

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Abstract
Chemical grouts are developed in response to the need to develop strength and control water flow in

to verify, which should be done experimentally.

An experimental investigation has been carried out to verify different probable flow patterns in long water tunnels and conduits, based on dimensional analysis. Applying dimensional analysis, the most effective dimensionless parameters on flow patterns were found and different flow pattern maps were introduced to find the flow regime for given hydraulic properties. It has been shown that among dimensionless parameters, pipe slope, void fraction and Froude number have the most significant effect on a two-phase flow interface.

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IDENTIFICATION OF ACCIDENT HAZARD INDEX FOR URBAN INTERSECTIONS AND RURAL HIGHWAYS IN IRAN

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Abstract

Identification of hazardous locations in a traffic network and evaluation of the potential hazard of these locations are major concerns in traffic safety management. The "Accident Hazard Index" helps the safety engineer to identify high accident location 'black-spots', in order to present a systematic method to allocate financial and human resources.

In this research, some basic concepts of the "Hazard Index" have been presented and it's importance has been clarified; then, the literature in this area has been reviewed. New formulas have been developed for computing the "Hazard Index" for intersections and highways. To reach them, the important accident causing parameters were identified and their numerical weights were determined based on expert opinions. A 'multi–criteria decision making method has been used to compute the numerical weights, regarding two criteria; the effect on accident number and the effect on accident severity.

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CONSIDERING THE CAPACITY OF PANEL ZONES WITH DIFFERENT GEOMETRY CASES ACCORDING TO STRENGTH BASE DESIGN

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Abstract

Panel zone is one of the most important elements for transferring the lateral load to other elements in Steel Moment Resistant Frames. To some extent, this element, through its suitable ductile behavior with beams, which, themselves, have been known as ductile elements, can increase the overall ductility of SMRF. The suitable design procedure for this element and details, can highly affect the performance of SMRF.

Because of the lack of present research and attention, especially on panel zones with unequal beam depth on two sides of the panel zone and their effect on the panel zone when a monotonic load is acting on SMRF, the main aim of this paper is to consider the capacity of panel zones individually, with unequal beam depth on two sides. The research method is based on verifying the analytical model, built into the ANSYS Finite Element Software, with an experimental model in a laboratory test. This verification permits one to make different models with a variety of geometry parameters of the panel zone (i.e. depth of beams and thickness of column flange).

Finally, hysteresis loops of the panel zone are used for comparing the suggested code formulations for the capacity of a panel zone.

The obtained results from this research show that the present formulation in the 2800 standard (third edition) in some geometry cases is over or under estimated. When the thickness of the column flanges increase, the capacity of the panel zone which is provided by the 2800 standard, is less than the results obtained in this research. In the case of exterior columns (which are connected to only one beam) or in a case of interior columns with equal beams, as the thickness of the column flanges decrease, the obtained results are less than the values provided by the 2800 standard.

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INVESTIGATION OF ENDURANCE TIME METHOD IN SEISMIC ANALYSIS OF TWO DIMENSIONAL STEEL FRAMES AS COMPARED TO STATIC METHOD

ABSTRACTS OF PAPERS IN ENGLISH

APPLICATION OF NONLINEAR PROGRAMMING METHODS TO THE OPTIMAL DESIGN OF SEWER NETWORKS

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Abstract

The construction cost of municipal sewer networks, as any other infrastructure system, is very demanding. These costs can, however, be reduced through optimal design of these networks. A nonlinear programming technique is used in this paper for the optimal design of sewer networks with a predefined layout. The problem of a minimum cost sewer network design is originally a constrained optimization problem. The originally unconstrained optimization problem is first recast into an unconstrained optimization problem, via the use of a penalty function approach. The resulting unconstrained problem is then solved using an all-purpose nonlinear programming tool. Pipe slopes are considered as the decision variables of the problem, which are then used to choose the pipe diameters from a set of commercially available diameters. The efficiency of the proposed method is verified via an analytical example and two benchmark problems from the literature. The results show the ability of the method to produce designs comparable to the results of existing methods in the literature, with much fewer computational requirements.

TWO-PHASE AIR-WATER FLOW PATTERNS IN HORIZONTAL AND NEAR HORIZONTAL WATER TUNNELS

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Abstract

When two fluids with different physical properties, such as air and water, flow in a pipe, different flow patterns may occur. Flow pattern includes the distribution of each phase in respect to the other. In other words, the main property of two-phase flow is the shape of the interface between two fluids, which is due to the physical and hydraulic properties of fluids and flow. The behavior of the flow very much depends on its phase and, hence, very important