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Handbook of Concrete Culvert Pipe Hydraulics
 Reinforced Concrete Construction ...: Bridges and culverts
 Conduits, Culverts and Pipes
 BOX CULVERT (5,5 M X 5,4 M) X 4,5 M
 Hydraulic Design of Improved Inlets for Culverts
 Engineers' Pocketbook of Reinforced Concrete
 How to Structurally Design a Concrete Slab Culvert? RC Slab Deck Design Using the FORTRAN-95 Program
 The Manual for Bridge Evaluation
 Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary (ACI 318R-05)
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LIA NICHOLSON

Handbook of Concrete Culvert Pipe Hydraulics

Amer Society of Civil Engineers

This Standard covers the direct design of buried one-cell precast reinforced concrete box sections for the conveyance of sewage, industrial wastes, storm water and drainage, and to serve as tunnels. The design and analysis method accounts for the interaction between the box sections and soil envelope in calculating loads, pressure distributions, moment, thrust and shear in the box section, and includes a procedure for calculating the required reinforcement. Load effects are determined separately for each loading. The structural design of one-cell precast

reinforced concrete box sections is based on a limits state design procedure that accounts for strength and serviceability criteria and is consistent with the procedures outlined in Section 17 of the AASHTO Standard Specification for Highway Bridges. The design criteria include: structural aspects, such as flexure, thrust, and shear strengths; handling and installation; fatigue limits; and crack width control. The design of a one-cell precast reinforced concrete box section is based on the assumption that specified design bedding and installation requirements will be achieved during construction of the installation. Owners and owners' engineers will find this Standard useful in preparing contract documents based on the direct design method.

Reinforced Concrete Construction ...:

Bridges and culverts American Concrete Institute

This comprehensive manual of water supply practices explains the design, selection, specification, installation, transportation, and pressure testing of concrete pressure pipes in potable water service.

Conduits, Culverts and Pipes Legare Street Press

Generally accepted methods for the structural design of pipe culverts require determination of the magnitude and distribution of loading and selection of a readily available rigid (concrete) or flexible (corrugated metal) culvert compatible with the loading. Although the Marston-Spangler and the more recently developed ring compression theories are currently being used extensively as a basis for designing buried conduits, a great deal of

engineering judgment is involved in applying these load determination procedures, particularly in the case of rigid culverts. In addition, durability and handling problems, which are frequently critical in the case of flexible culverts, require the exercise of considerable engineering judgment. One of the major uncertainties faced by the present-day designer is associated with the appropriate consideration of construction practices. This problem, together with the difficulty of specifying a generally acceptable failure criterion, makes the selection of a suitable safety factor extremely complicated.

BOX CULVERT (5,5 M X 5,4 M) X 4,5 M

Downsview, Ont. : Ontario, Ministry of Transportation, Structural Office
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Hydraulic Design of Improved Inlets for Culverts iENGINEERING

This revision of the ASCE Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD) is a replacement of ANSI/ASCE 15-93. This Standard focuses on the direct design of buried precast concrete pipe using Standard Installations, and reviews the design and construction of the soil/pipe interaction system that is used for the conveyance of sewage, industrial wastes, storm water, and drainage. To account for the interaction between pipe and soil envelope when determining loads, pressure distributions, moment, thrust and shear, this volume presents the SIDD method for buried precast concrete pipe. Excavation, safety, foundation, bedding, sheathing removal and trench shield advancement are among those construction requirements for precast concrete pipe designed by the SIDD method that are presented here. This standard practice may be used as a

reference in preparing project specifications based on the SIDD method. Four types of standard embankment installations and four types of standard trench installations are covered in the standard. The limits state design procedure specified for the design of pipe is consistent with the procedures outlined in the AASHTO Standard Specifications for Highway Bridges. The commentary provides supporting background data.
Engineers' Pocketbook of Reinforced Concrete American Water Works Association

Standard ASCE/CI 15-17 focuses on the direct design of buried precast concrete pipe using standard installations, or SIDD.
How to Structurally Design a Concrete Slab Culvert? RC Slab Deck Design Using the FORTRAN-95 Program Amer Society of Civil Engineers

Master's Thesis from the year 2013 in the subject Engineering - Civil Engineering, grade: Very Good (A), Addis Ababa University (Addis Ababa University Institute of Technology), course: Structural Engineering, language: English, abstract: This thesis focuses on the development of a FORTRAN 95 program for the structural design of the superstructure part of a concrete slab culvert. FORTRAN 95 is a programming language used in the fields of scientific, numerical, and engineering fields. In this thesis, this language has been used to develop the program for the structural design of reinforced concrete slab culvert deck. The input data for at grade and at fill slab culverts are saved on a note pad in the external file folder which constitute the material properties, geometric features and proposed diameter of reinforcement bars of the slab culvert and its deck in the folder which contains FORTRAN 95 program. The output data is written on the note pad in the external folder based on the format assigned for each output in the folder which contains the design results of slab deck thickness and area, spacing and length of main, distribution and temperature reinforcement bars. Besides Edge beam design parallel to the traffic is executed and shown in the output result by the developed program. Concrete slab culvert is an important structure used to convey trucks and pedestrian along a road corridor or in one of a range of other situations. This structure is highly constructed in highway road projects in Ethiopia. In this study, a FORTRAN program is developed for the structural design of reinforced concrete slab culvert deck according to the provisions given in AASHTO LRFD Bridge 2005 Edition. The developed program is expected to assist

the structural designers and users to design the superstructure part of a reinforced concrete slab culvert deck efficiently with great accuracy. Both at grade and at fill slab deck thicknesses are computed according to the specification specified in AASHTO LRFD Bridge 2005 Edition. The reinforcement bars are also designed based on the requirements specified in the code. Within the context of this work the program is developed in four steps. The first step is to define and analyze the problem; the second step is to develop an optimal solution and designing the program, the third step is coding the program and the final step is testing and documenting the program.

The Manual for Bridge Evaluation GRIN Verlag

TRB's National Cooperative Highway Research Program (NCHRP) Report 619: Modernize and Upgrade CANDE for Analysis and LRFD Design of Buried Structures explores the development, modernization, and upgrading of the CANDE (Culvert ANALysis and DESign) program to a new program called CANDE-2007. The CANDE-2007 installation files are included on a CD-ROM with this report. The installed program includes integrated help files and 14 tutorial examples.

Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary (ACI 318R-05) Transportation Research Board

Design and check of reinforced concrete box culverts rectangular, single cell, enabling crossing below roads and drainage works. The analysis model used is that of a thick three dimensional triangular finite element type mesh, which considers deformation due to shear. They are made up of six nodes, at the vertices and mid-points of the sides, each with six degrees of freedom. A mesh is applied on the culvert, the spacing of which depending on its dimensions (thicknesses and spans). By means of a linear elastic analysis, eight forces are obtained for each node which are used to check and design the concrete section and reinforcement. As well as the displacements other checks that are carried out include, deflection, ground bearing pressures, possible mat foundation uplift, etc.

Bulletin; 21 (1936-1941) AASHTO
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