
Software : An update

After the publication of a Special Issue on 'IT for Construction Industry' in December 2000, we received many enquiries from our readers asking for details about the software mentioned in some of the papers in the Special Issue. In response, we are providing an update of some of the software mentioned in the published papers for the benefit of the readers. The update also includes a few more software not mentioned in the papers.

ADAPT software system

ADAPT-ABI software is a finite element program tailored for the analysis and design of post-tensioned concrete bridges and frames. It is particularly suited for balanced cantilever, incrementally launched, span-by-span, cable-stayed, cast-in-place box girder, and precast prestressed girders spliced for continuity. The program can simulate step-by-step construction of a bridge, right from the foundation to the completion of construction. At each step in construction, the program gives the critical design values, including the deformation and forces in each of the bridge members. The software has a track record of over two decades, and has been continuously upgraded to meet the challenges of design engineers and keep abreast with the latest developments in computer and software technology. Its current version is a Windows based program running on personal computers (PCs) with a minimum of 64 MB of RAM and 100 MB of available hard disk.

ADAPT software system has been serving design engineers in 65 countries or so across the world. It has been the basis of design of many notable bridges.

ADAPT-ABI performs a comprehensive time-dependent analysis of

concrete bridges and frames, during the construction phase and after the structure is complete. ABI can investigate the effect of newly placed concrete, creep, shrinkage, relaxation in prestressing over time, aging of concrete, and variation in temperature. Its graphical interface displays moments, shears, stresses and deformations for various stages of construction. The software can handle non-prestressed concrete, precast, cast-in-place, pretensioned or post-tensioned frames. It handles both bonded and unbonded post-tensioning systems and external tendons. Other applications of the software include composite construction consisting of precast girders and concrete topping. The basic module of this software is a stand-alone self-contained program capable of analysis of the entire construction phase of a bridge. This includes determination of camber for geometry control during construction.

The modeling of concrete material follows the common codes, such as ACI, and CEB/FIP recommendation. However, the program is designed to accept other concrete material models, such as the Indian code or the British standard. In the latter cases, the user enters the parameters of the concrete model as input data. In addition to code-defined material properties, creep, shrinkage, and variation of the modulus of elasticity with time can be expressed from laboratory measurements of test specimens.

The capability of the software is enhanced through three add-on-modules which are described below.

ADAPT- Gen module

The principal feature of this module is the generation of load combinations and enveloping for design. In addition, ADAPT-Gen enables the user to do the following :

- (i) break the structure into spans and columns,
- (ii) display and tabulate the solution in a span-and-column format, and
- (iii) include automatic pattern loading.

Other features are directed towards making the software an effective production tool.

ADAPT- Moving load module

The moving load module is developed primarily for bridge construction. Using the software's library of the most common truck or train loads, or a user-defined library, the program automatically moves the loading along a user-defined path and generates an envelope of sectional actions for combination with other loading. The moving load module of ABI is general and comprehensive. It is designed to cover practically all foreseeable conditions in bridge design. The module is general and can be adapted to local building code.

ADAPT- Friction and elongation module

At the completion of an ADAPT-ABI computer run, and without any additional input data, this module calculates the elongation of each of the tendons at stressing and the associated stress losses. The stress losses include the effects of friction, and the time-dependent parameters of creep, shrinkage and relaxation in prestressing.

For further details, please contact:

Dr Bijan O Aalami
ADAPT Corporation
1733, Woodside Road, Suite 260
Redwood City, CA 94061, USA.
Tel: +91 650 306 2400
Fax: +91 650 364 4678
E-mail: bijan@adaptsoft.com or
E-mail: info@adaptsoft.com

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