



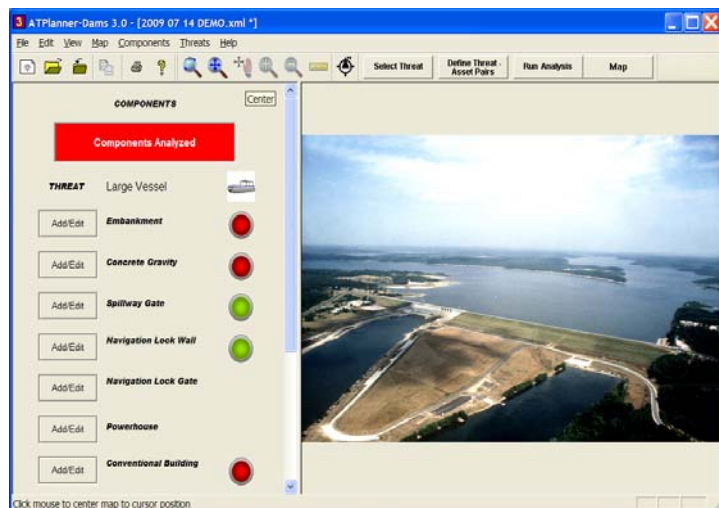
US Army Corps of Engineers  
**BUILDING STRONG®**

## Blast Damage Estimation: Anti-Terrorist Planner for Dams

The goal of the U.S. Army Corps of Engineers (USACE) Critical Infrastructure Protection & Resilience (CIPR) Program is to achieve a more secure and more resilient civil works critical infrastructure portfolio by enhancing protection capabilities in order to prevent, deter, or mitigate the effects of manmade incidents and improve preparedness, response, and rapid recovery in the event of an attack, natural disaster, and other emergencies. The CIPR program supports the National Infrastructure Protection Plan and the National Response Framework, and it is directly aligned with the Dams Sector-Specific Plan. The objectives of the CIPR program include assessing and prioritizing Corps civil works critical infrastructure by implementing a portfolio-wide risk assessment framework. This requires the development of blast damage estimation tools to support the assessment of critical components on dams, locks, and levees as part of the overall risk evaluation process.

### Purpose

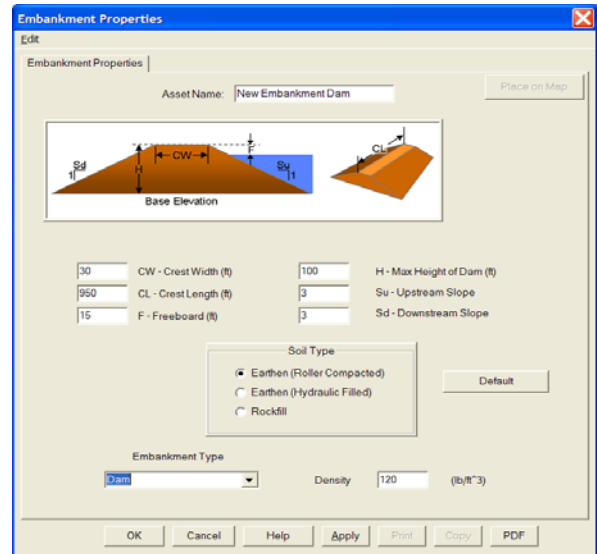
USACE, in collaboration with the U.S. Department of Homeland Security (DHS), has devoted significant efforts to develop engineering models that enhance the understanding of blast damage effects on dam and navigation lock wall components resulting from landside or waterside attack scenarios. To that end, USACE and DHS are collaborating on the development of the Anti-Terrorist Planner for Dams (ATPlanner-Dams) software tool. This tool is based on simplified engineering models developed by USACE, and facilitates quick assessments of blast effects on dams and navigation locks components. ATPlanner-Dams is intended to provide approximate, yet realistic damage levels that can be utilized as part of an overall risk assessment process. A recently improved version of the tool incorporates enhanced blast damage assessment models as well as a streamlined interface to define major dam components and facilitate their analysis based on generic threat scenarios.



ATPlanner-Dams provides the capability to conduct simplified damage assessments on the following dam components:

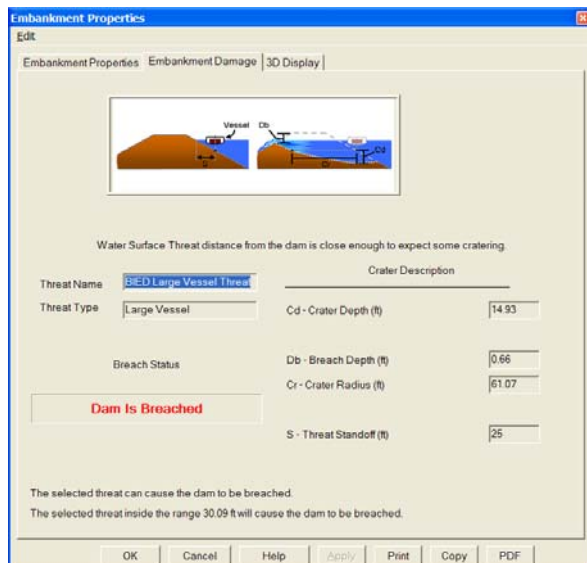
- Embankment sections
- Concrete gravity dam sections
- Spillway gates
- Navigation lock sections
  - Lock gates
  - Lock chamber walls
- Powerhouse walls
- Buildings (control room, visitor center)

The development of ATPlanner-Dams is supported by an extensive array of research and development efforts that include high-performance numerical modeling as well as experimental efforts. Initial research efforts, which primarily focused on blast embankment cratering effects, have been expanded to systematically include waterside attack scenarios for concrete gravity dams, navigation locks, and spillway gates.



## Implementation

ATPlanner-Dams is a standalone software tool, supported by a user's manual and technical reference guide. The software presents a list of available dam component categories, from which the user can select. Input information from design drawings to define each component to be analyzed is defined by the user. A particular threat of interest is selected from a generic list for analysis, which includes various landside and waterside scenarios.



Any defined component can be selected for analysis against a particular threat, and where appropriate, the threat standoff-distance to the component of interest can be entered. The assignment of a generic threat to a given component facilitates the blast damage analysis estimation. Analytical results are displayed on screen, along with a summary report with damage estimates that can be automatically generated into an analysis output file. Results from ATPlanner-Dams may be used in support of facility risk assessments to determine whether operational changes or security measures are warranted, or to determine breach conditions for consequence analysis such as human impact and economic damage estimations.

## For Additional Information

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