Baystate Roads Program
Local Technical Assistance Program (LTAP)
Tech Notes

Tech Note #32 -- 2003

Pre-Cast Concrete Public Access Ramp

Worcester DPW initiated a project to improve the current construction methods that are being used to build Public Access Ramps (PAR). The goal is to design and produce a pre-cast concrete ramp or ramps that accomplish the following:

- A ramp that complies with the rules and regulations of the Architectural Access Board (AAB) specifically promulgated within the Commonwealth of Massachusetts under 521 CMR and those specifications published under the jurisdiction of the Americans with Disabilities Association (ADA).
- A ramp that is practical to produce and install.
- A ramp that is durable and functional.
- A ramp that is easily recognized and aesthetically pleasing to the general public.

SPECIFIC PROBLEM

The construction industry has been struggling to comply with state and local regulations regarding handicap ramps (specifically maintaining the slope of the ramps.). The primary reason for this difficulty may be found in the method of their construction. Currently, the main (i.e. flat) part of the sidewalk is constructed first. A ramp is then installed between the existing walkway and the roadway. Using this method, the slope of the ramp must be varied to meet the sidewalk and roadway elevations. This results in ramps that are inconsistent with ADA standards.

In contrast, a pre-cast concrete ramp would be installed first, thus providing control points to build the main sidewalk into. This would provide a smooth transition that will comply with ADA standards.

POTENTIAL IMPACT

As a result of using a pre-cast concrete ramp, pedestrian traffic, as well as the appearance of our walkways, will be significantly improved. The advertising feature will build a communication bridge between the business community, the general public and the construction industry. Other positive results that this product will have is as follows:

- The potential cost savings will allow communities to address more sites that need ramps.
- The contractor has an economical solution that works and meets ADA standards.
- People that rely on properly built ramps will be able to have more mobility.
- The general public receives a functional aesthetically pleasing product at a reasonable price.

SUMMARY OF CONCEPT

The idea of pre-cast ramp was probably proposed in the past but there were several reasons why it was considered not to be practical such as:

1. Too heavy and difficult to maneuver.
2. Every ramp location was unique.
3. It was less expensive to build a ramp on site.

The pre-cast ramp in this project is innovative because it addresses and solves these issues as well as leading to the implementation of a new method of sidewalk construction. The concept of building the ramp first and then grading the sidewalk to meet it is a common sense approach that is practical.

Currently ramp locations at intersections are similar to snowflakes in that each one is different. For this reason contractors have difficulty estimating, constructing and making money producing them. Field-built ramps require the weather to be pleasant during installation as well. These are some of the reasons why contractors shy away from bidding work that includes ramps.

Once contractors become familiar with the installation process, they will be able to more accurately estimate the time and man-hours required for future projects. Weather conditions will not be a major factor. Pre-cast ramps will shorten the overall time it takes to complete a sidewalk project. This helps considerably when the project is in a high traffic or commercial area. The pre-cast ramp can be either stored at the job site or delivered when the location has been properly prepared for its installation. The latter option is advantageous because some job sites have little or no room for staging.

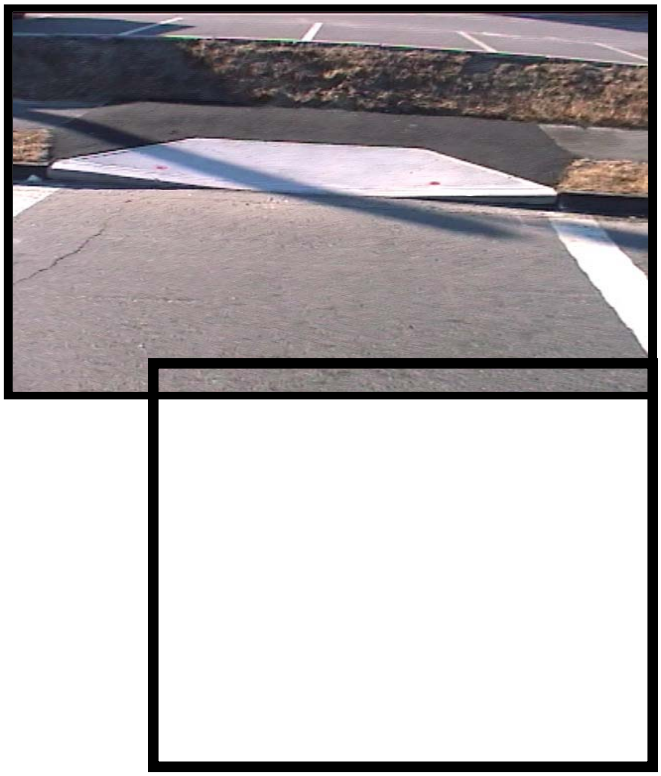
Thus, both the interest of the public as well as the concerns of contractors will be served under this new concept for sidewalk ramp construction. If you have any questions please feel free to contact Edmund Kochling, the designer of this system at City of Worcester, DPW (508)-248-6626 or (508)-799-1454.

INSTALLATION

The pre-cast ramps install as simply as patio blocks. The ramp location is excavated, coarse graded, and topped with a three-inch layer of stone dust. After compaction and fine grading the ramp is maneuvered into position with the boom of the backhoe. The ramp is set into position and checked for elevations. It can be lifted to allow for minor adjustments before it is lowered into its final position. The installation procedure should be completed in approximately 2.5 hours. Control points to which the sidewalk is later graded are now established, too, and there is:

* No overnight protection.
* No drying time.
* No vandalism problem.
* No forms to remove.

PRE-CAST PUBLIC ACCESS RAMP COST



The initial cost of a delivered Pre-cast Public Access Ramp is estimated to be between $500 and $600. In full mass production the cost of these devices could be as low as $450. Additionally, local sponsorship (see Advertising Section) could further reduce costs by providing funding for the cost of the unit, and more. The inclusion of these ramps in construction plans will reduce the cost of projects in the following ways:

- Shortening the overall field construction time
- Project estimates will be more accurate
- No re-do's caused by wrong slopes, vandalism or vehicles driving over and breaking them

FACTORY DESIGN

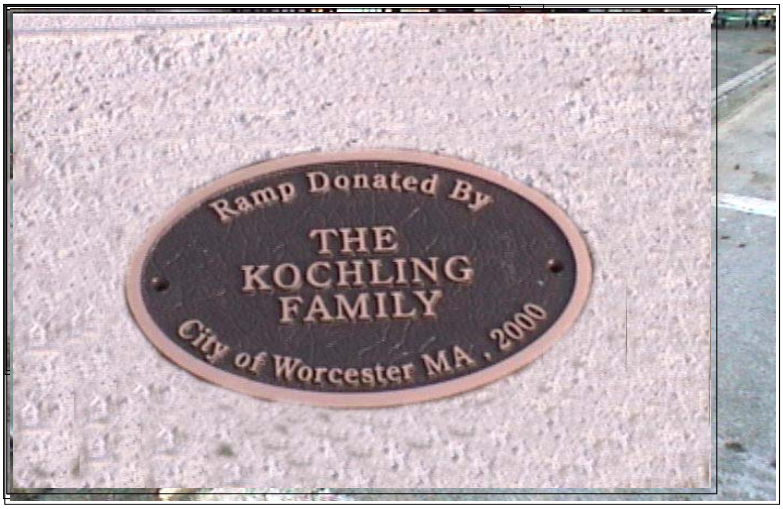
Factory built ramps are constructed in a production style controlled environment that allow specific design and cosmetic features to be implemented on a consistent basis. This construction design has distinctive advantages over a 'field-built' ramp. Some of the advantages are:

- Steel reinforcing
  Hollow cavity that makes it lighter to transport and install
- Controlled concrete strength, color and texture
- Monolithic design with respect to the curb
- Controlled slope
- Key-ways that lock ramp into place

EARLY DETECTION SYSTEM

The Public Access Ramp comes with an early detection system, which benefits everyone, especially those with impaired vision. This experimental system can be retrofitted for use on existing ramps in the area. It consists of heavy road tape with a rough surface texture placed on the curb at either side of the ramp opening. A piece of aluminum diamond plate or a bronze medallion would be installed in the center top portion of the ramp. The tape and plate or medallion together form a triangle of sensory points that the vision impaired can detect with their feet or a cane. This triangular system will help people locate and orient themselves on the ramp.

ADVERTISING



Sponsorship of these devices can be solicited from local businesses and individuals. As part of the sponsorship program the donation would provide funds for a new ramp with a bronze medallion, advertising or memorializing, the firm or individual. Depending on the production cost of the ramps, the suggested donation of $1,000 could pay for the ramp, including the medallion, and a portion of the installation costs. This advertising program has the potential to create community support and cooperation as well as reducing the cost of ramp installation fees and overall project costs.

ISSUE	PRE-CAST RAMP	BUILT-IN-PLACE RAMP
Meets ADA Specifications	Yes	Not always
Cost	· $500 per unit (Cost will be reduced as product becomes more prevalent) No re-do's as a result of: · Poor construction · Breakage · Incorrect slope · Weather · Curb adjustment · Inconsistent material	The cost varies due to the following: · Form work · Curb work · Mobilization · Re-do's · Workers' ability · Weather · Time schedule · Concrete protection · Consistency of material
Field Installation	1. Mobilize 2. Prepare site 3. Install ramp 4. Miscellaneous work to finish job 5. Total time - 1 day minimum Note: (pre-cast ramp previously delivered and stored at site.)	1. Mobilize 2. Prepare site 3. Curb work 4. Form work 5. Pour concrete 6. Finish concrete 7. Proctect concrete until it cures 8. Mobilize 9. Miscellaneous work to finish job 10. Total time - 2 days minimum
Steel Reinforcing	Yes (Designed for H-20 Loading)	No
Weather	Not a factor	Important factor
Concrete	5000psi (Factory Controlled)	4000psi (No Control to Guarantee Strength)
Early Detection System	Yes	No
Aesthetics	Finish- Consistent Color- Consistent Texture-Consistent	Finish- Not consistent Color- Not Consistent Texture-Not consistent
Curb Separation Possible	No	Yes

Reprinted with permission from Edmund T. Kochling, an engineer with Worcester Department of Public Works. He developed this pre-cast concrete access ramp with the support and assistance of Robert L. Moylan, P.E., Commissioner, and Edward J. Carrigan, P.E., Director of Engineering, Department of Public Works, City of Worcester, MA.