

Stringless Paving Construction



Observations from the FHWA Mobile Concrete Technology Center (MCTC)

Stringless paving is the process of constructing a pavement using non-contact, electronic guidance systems to control the paver elevation and steering without the aid of string lines. Contractors across the United States are switching their primary method of paving from string line to stringless control. The differences between the two processes should be understood by both agencies and contractors. The traditional means, methods, and inspection requirements applicable for paving using string line controls don't always translate directly to paving using stringless controls.



Three Steps in Preparing for Stringless Paving:

- ✓ Develop pavement surface model(s)
- ✓ Transfer the model(s) to the paver's on-board computer
- ✓ Establish survey control points to tie the model to the grade for paving operations

Tips for Agencies:

- ✓ Conduct additional training for inspectors and construction management consultants on how to review, inspect, and accept 3D construction projects.
- ✓ Supply completed electronic plan sets to the contractor for their use in developing their surface models.
- ✓ Be mindful that inspection and acceptance should become more sophisticated with the review of the 3D model and independent verification of control points, grade, and finished surface location.

Tips for Contractors:

- ✓ Train/hire staff dedicated to stringless paving.
- ✓ Check the completeness of the (Triangulated Irregular Network) TIN/3D model from the agency/consultant. Gaps or errors can cause grade or ride problems if they are not identified before paving.
- ✓ Plan for and establish a complete control network throughout the project limits, paying attention to terrain and GPS and total station line of sight signal limitations.
- ✓ Verify control system configuration daily for pan position relative to the prism mast elevation.
- ✓ Check, maintain, and have spare batteries available for survey equipment.
- ✓ Maintain good separation, line of sight, and "leapfrogging" practices with the survey instruments.

Stringless Brings Changes:

- ✓ Removes ability for traditional visual inspection of horizontal and vertical grade from removal of hubs and string line. Everyone should get used to paving without visual reference.
- ✓ Training for different survey skill sets on both contractor and agency field technician teams. A dedicated crew is suggested.
- ✓ Periodically updating the equipment/software.
- ✓ Carefully planning where stringless, string line, and formed paving make most sense.
- ✓ Allows new opportunities for phasing because reduced side clearance may mean flexibility for concrete paving in tighter areas.

Specific Benefits:

- ✓ **Quality:** Potential for smoother pavements is possible.
- ✓ **Safety:** Removes string line (a tripping hazard).
- ✓ **Survey Cost:** Replaces 25-foot interval for hubs for 500-foot control points.
- ✓ **Pre-Check:** Affords a check of the model before paving if model is used for trimming.
- ✓ **Field Time:** Eliminates setting and removing string line in the field.
- ✓ **Jobsite Logistics:** Opens access to grade for concrete delivery.
- ✓ **Workforce:** Aids hiring new talent familiar with and excited by technology.

FHWA is the source of all images.

For Further Information:

- ✓ [FHWA TechBrief on Stringless Paving](#)
- ✓ [FHWA 3D Engineered Models Website](#)