

Use of GPS and SmartGrade Technology in Heavy Civil Construction

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Heavy Civil is a sector in the construction industry involving a variety of different heavy machinery and construction practices. Technology has evolved as an important aspect in this sector striving to improve efficiency, productivity, and traditional construction methods. Global Positioning System (GPS) technology is one of the many technological advancements that benefit any size of contractor in the heavy civil industry. With the help of a 3D model, base station, and rover, contractors implement advanced building methods that provide excellent owner satisfaction. Similar to GPS, SmartGrade is a tool integrated into heavy machinery that enhanced performance without the need of wiring or masts. I researched these technological systems through an interview with the Director of Construction Positioning Technology at John Deere, and President of Brough Construction, Inc. a local general engineering contractor. With these interviews I concluded that this technology indeed offers great benefits to the contractor. Examples of these benefits include: increased productivity levels, increased efficiency, minimized material overages, and a guaranteed return on equity for an investment in this technology. There is no reason why a contractor should not invest in this type of equipment since the industry is moving towards more reliable and effective construction practices.

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GPS Rover & Pocket 3D at work in Avenal, CA



GPS Base Station



Traditional Motor Grader with GPS Cabling & Mast



New SmartGrade Motor Grader (Fully Integrated with GPS) (John Deere)

How is this GPS technology used in the industry?

GPS refers specifically to the NAVSTAR Global Positioning System, which is a constellation of satellites developed by the United States Department of Defense. GPS technology uses GPS satellites, radio and onboard computers to give a real time position on the corner of the cutting edge of a machine or the tip of a GPS rover rod. This will show you where you are in terms of latitude, longitude, and elevation on the project site in reference to a 3D model.

What is SmartGrade technology?

Similar to GPS, SmartGrade removes the masts and the cabling that was previously visible and instead integrated into the machine. SmartGrade uses newer measurement unit sensors instead of the older vial slope type sensors. The implementation of this technology focuses on the overall performance of the equipment. The machine performs at optimal RPMs and speeds all of the time, which results in less wear and tear on the equipment and reduces fuel usage.