Customer Story

Trimble technology helps finish Indian expressway ahead of schedule

Business Challenge

The Indian building and infrastructure industry is not exactly known for embracing new technology. Although it is seen as desirable, it is often deemed too complex to be used by workers with basic skills.

Solutions:

- Trimble GCS900 3D Grade Control System
- Trimble SPS986 GNSS Smart Antenna

Benefits:

- Using the conventional staking system method, we were able to grade 90–100 m^3 per hour. With Trimble GCS900 3D Grade Control System, the result now is 180 to 200 m^3 per hour.
- The Trimble system does not require a highly skilled operator.

Ashoka Buildcon Limited (ABL), a leading building and infrastructure contractor in India was able to deliver on timelines and technical accuracy parameters set by the Uttar Pradesh Expressway Industrial Development Authority (UPEIDA) for its prestigious project, the Bundelkhand Expressway. Ashoka was able to meet targets, achieve greater grading accuracy, save on materials and improve job site output.

The Bundelkhand Expressway project links the Bundelkhand area in central India with the national capital Delhi, through the Agra-Lucknow expressway and Yamuna expressway. This fast moving and smooth traffic corridor is part of the larger development goals of the Uttar Pradesh (UP) government. The UP administration aims to link various manufacturing units, development centres and agriculture producing areas located along the expressway with the national capital. It is hoped this will boost not only industrial income but also revitalise commerce, agriculture and tourism. The importance of the project can also be gauged by the critical role it is expected to play once it is linked with the Defence Industrial Corridor in the coming years.

The expressway starts near Bharatkoop (at Jhansi-Prayagraj National Highway No. 35) in the Chitrakoot district, a centre of Hindu pilgrimage, and ends near the village of Kudrail, in district Etawah (on Agra-Lucknow expressway), a cotton producing area. The total length of the project is 296 km.

The UPEIDA divided the Bundelkhand Expressway into six packages, divided between four contractors of which the ABL group was allotted the third package. "This package is from Kaohari (Mahoba district) to Brolikharka (Hamirpur district) in UP and covers 49 km to be built at the cost of Rs 1079 crore," explained Mr. Sham Lokhande, the ABL Head of the Project on the ground. He added that this is the first time that a project scheduled to be finished in 36 months will be completed in 24 months. "Without technology this would not have been possible," said Mr. Lokhande.

The Trimble GCS900 3D Grade Control System guiding a Case motor grader and the SPS986 Site Positioning System to check the grade.

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MR SHAM LOKHANDE

ABL Head of the Project on the ground

"I have never experienced such success in my professional life. The total length of the expressway is 296 km. Quantum of work is approximately 1 crore (ten million) m³ earthwork. This is tremendous output. We have broken our own record. This is despite Covid restrictions and unprecedented monsoon rains this year," said Mr Lokhande. The ABL group had shown the use of **Trimble® GCS900 3D Grade Control System** technology to the UPEIDA chief of project and the chief engineer, both of whom expressed appreciation at its use and accuracy achieved in grading.

The Indian building and infrastructure industry is not exactly known for embracing new technology. Although it is seen as desirable, it is often deemed too complex to use by workers with basic skills. The CEO and Director of ABL, Mr Sanjay Londhe who is based at the company's headquarters in Nasik highlighted the fact that Indian companies are slowly changing. "People's mindset is changing. If you ask me, people like me would be happy to know if what is planned on the drawing table can be achieved with Artificial Intelligence (AI). I am speaking not only of digital tech but of remote control and quality assurance," said Mr. Londhe.

Mr. Lokhande elaborated, "I had never deployed this kind of technology before. In terms of automation I have seen the use of tractors for making roads, then graders and now advanced graders, but honestly, when the **Trimble GCS900 3D Grade Control System** was first suggested by our company head office in Nasik (Maharashtra), we had doubts. We were not very confident. However, this changed once Trimble sent their engineering staff. Technology companies usually handover technology and disappear from the scene, however Trimble initially supported us on site with resources that trained our staff in the data preparation and operation of the system. Technology is appreciated, its cost debated but its implementation is justified and really proves its effectiveness after a short period of on site support from local Trimble staff.

Apart from achieving completion ahead of time, the Bundelkhand Expressway project faced several other challenges such as multiple structures on the 4-lane highway. These include four railway over bridges, 14 large bridges, six toll plazas, 266 small bridges and 18 flyovers. The multiple structures means that construction of the road is also executed in short stretches. "This is a Greenfield project (one where land on which the project is built has never been utilized before) and package 3 includes more than 150 structures. This means we did not get any long stretches. The work had to be done in parcels," said Mr. Lokhande. Mr. Sobhag Singh Kharte, the ABL official in charge of Plant and Machinery, had a similar response, "The road here has been made in short stretches, some as short as 200–300 meters because of the multiple structures. This slowed down our overall output. But the **Trimble 3D Grade Control System** helped us complete our project before the deadline."

The ABL team used four motor graders on the 49 km stretch of the Bundelkhand Expressway package 3, half of which was executed manually, and the **Trimble GCS900 3D Grade Control System** was installed on one 845B Case grader to test the benefits of the technology. "Earlier when we worked manually, construction was checked in fixed locations. We had to use rods and strings—what is called the staking system—it was time consuming and required a large

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team. Now **Trimble GCS900 Grade Control System** does that work for us. Using the conventional method, we were able to grade 90–100 m³ per hour. With grade control, the result now is 180 to 200 m³ per hour," said Sumit Kumar Singh, ABL Surveyor and Supervisor. "We even used it at night. We completed a 6 km profiling of the road by using it at night." In all, 24 km were completed using the **Trimble GCS900** system.

"We are convinced of its output and efficiency, and we'd like to use it on all our graders in current and future projects"

"For the grading and laying of the GSB (Granular Sub Base), the use of the **Trimble GCS900 3D Grade Control System** on the grader has definitive advantages. It makes it easy to achieve the required accuracy of + 10 mm, this is much faster and more accurate than with conventional methods. If we are to speak of overall output, with a traditional method using a routine grader we could make 250–300 m bed in a day. With the use of the **Trimble GCS900 Grade Control System**, output was doubled. Since this is a very prestigious highway project, we were very happy because it sped up the work. The output was satisfying, especially since this project had its own challenges," said Mr. Lokhande.

"The **Trimble SPS986 GNSS Smart Antenna** provides a real-time comparison between the design and actual surfaces. At the same time, it records and creates the current surface in real-time as a digital terrain model in the field. For us it was especially useful in planning right/left or left/right staggers. It was also useful in central line marking. The Trimble system is an efficient aid," said Mr. Madhu Sudan, ABL's Head Surveyor.

Mr. Vivek Dhamala, head of ABL's Operations and Highway materials said the use of the Trimble system reduced operational costs. However, he emphasized that since it was installed in November 2020, with the Covid pandemic restrictions and Monsoon rains upsetting the schedules, it was only a short time to calculate the benefit. "What I can say is that our operation cost was saved in terms of manpower. It's a technology for the future. In this project we have graded 3000 m³ of GSB in 12 hours with the help of the **Trimble 3D Grade Control** system," said Mr. Vivek. This sentiment was also echoed by Mr Ajay Chitnis, Head of Asset Management (Plant and Machinery) ABL Group, "The Trimble system helped our site team increase the hourly production without any rework, we did fine grading on the night shift also, which increased efficiency and utilization of our assets and crew."

"The best part is that the Trimble system does not require a highly skilled operator, which is a huge benefit. Once the data is uploaded into the system, the operator just has to select it," said Ravi Kumar Sharma, head of ABL's Plant and Machinery. Mr. Arif Khan, the operator of the 845B CASE grader on which the Trimble system was installed, added, "In the conventional method I had to position the blade of the grader intuitively by eye. Now it is precise. I select Automatic operation and the system guides the blade elevation and slope to the design. Once that's done it is smooth sailing."

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