

# Case Study

## KSHIP: Bijapur Bypass Project

### Client

The Government of Karnataka has implemented the Karnataka State Highways Improvement Project (KSHIP) with the assistance of World Bank funding.

The Karnataka State Highways Improvement Project aims to improve the core road network in Karnataka. The core road network is defined here as the state highways plus the most heavily trafficked major district roads. KSHIP will enhance the capacity and quality of the core state highway network; provide safer transit on selected corridors; improve allocation and provide adequate funding for the road sector; and provide more efficient and effective network management and delivery of road infrastructure services.

### Project

Bijapur is a district head quarters in northwest part of Karnataka. The Bijapur bypass road is 6.5km in length. The proposed construction of Bijapur bypass alignment starts at Bijapur-Tikota road and from this point the existing kutcha road forms the alignment and moves towards south and bends gradually. After 2.4 kms, the bypass intersects Bijapur-Jamnkhandi road. Then, the alignment moves towards east on dry land and intersects NH 218 (Bijapur-Bagalkot road. Further the alignment bends and moves towards east and joins NH-13 south-east of Bijapur town. The project was divided into 3 reaches (area codes) under one milestone. Further those reaches were divided into 9 chainages. Reach1 was from 0-2.46 km, Reach2 was from 2.46-4.72km and Reach3 was from 4.72-6.437 km. In addition to the above, project also included the construction of 28 culverts at the various chainages.

### Project Team

SMEC International Pty was the construction supervision consultant on the project. They have delivered the project in association with contractors Mehul Constructions. Along with the construction team KSHIP as employer had been responsible for bringing the project to completion on behalf of the Government of Karnataka (GOK).

## **Challenges in managing the project**

With a tight schedule of 10 months, making sure the right people responsible do the right work at the right time is an important component of keeping the project on track.

This challenge is made greater with numerous documents, drawings and approval items being exchanged between the client, consultant and contractor with factors like file size restriction in email and given the remote project location communications through hard copies would have been cumbersome.

Also, once the data collection mechanism is in place, lot of time is wasted in collating, calculating and developing the respective reports resulting in bottlenecks and difficulties in meeting their turnaround targets.

KSHIP identified that these issues would only escalate as the project ramped up.

## **Solution**

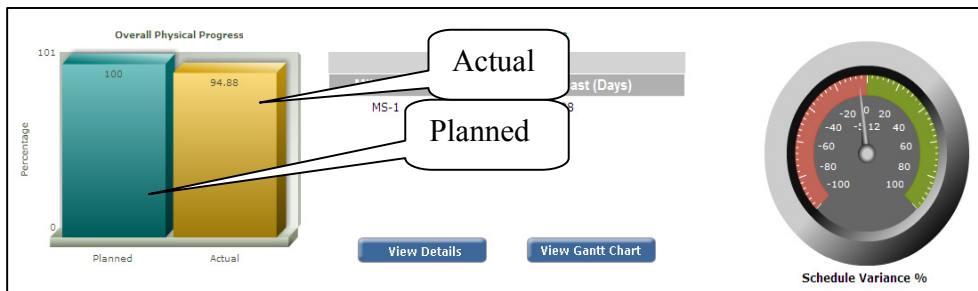
Following an extensive review of available solutions, KSHIP implemented the Backend Project Management System to control project progress and link the project team online. Backend Project Management System is a web-based platform that enables all project participants to plan, monitor, ensure quality and manage contract administrative works like variation orders, claims, constraints compliances and billing. It also enables project participants to view the project progress at any time during execution of the project through dashboard in terms of time, money, quality, constraint, compliance, project visuals and generate the respective reports.

Because Backend Project Management System is web-based, all authorized project participants can log in to the system and have full access to the information based on the rights their organization has assigned to them. It helps in enhancing and meeting the required security, scalability and performance standards. Further, records maintained in MS Project and MS Excel could be directly imported into the Backend Project Management System, meaning minimal IT resources were required for implementing an ongoing project.

## Result

Implementing Backend Project Management System resulted in benefits to all the stakeholders of the project. The internet based software application put all the stakeholders' viz., KSHIP as employer, SMEC as consultants, contractors, road users and the civil society were on a common communication platform. It had the necessary business intelligence built-in and some of its key performance indicators are listed below.

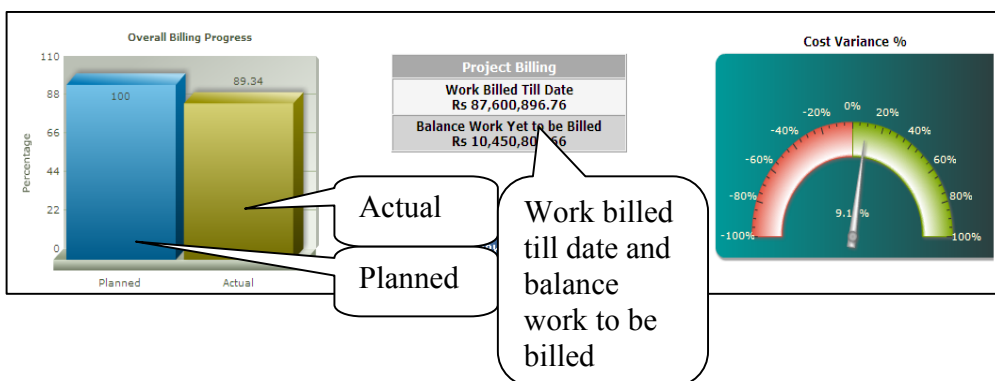
### Overall Physical Progress



KSHIP was able to monitor the physical progress of the project in a lot more detail. This resulted in better control with lower variance between the scheduled and actual achieved. The graph above shows that as on August 2008 physical progress of the project was 94.88 % against planned progress of 100 %.

The construction supervision team was able to monitor the progress mile stone wise, area wise or activity wise and drill down to the list of Request for Inspection (RFI) contributing towards that progress which allowed them to do better planning and management of the project.

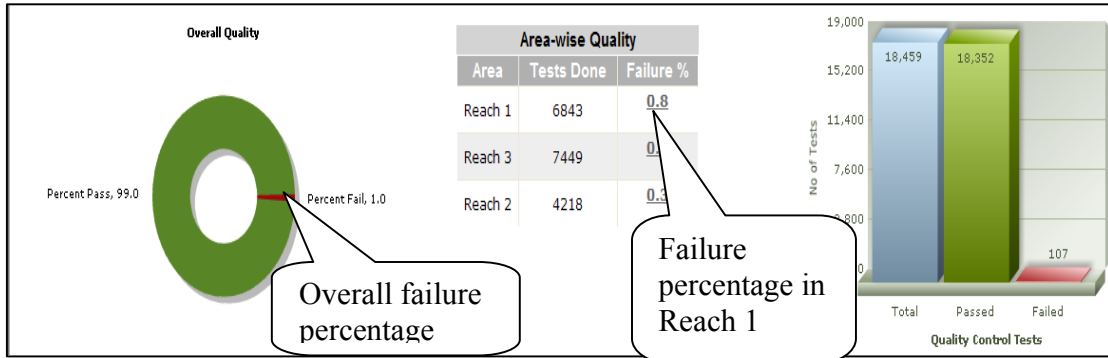
### Overall Billing Progress



The Interim Payment Certificates (IPC) was generated automatically for the actual work done based on the approved RFI quantities. As on August 2008, 88.34% of project work had been billed.

## Quality

About 19,000 quality control tests were conducted in the course of the project. The construction supervision team was able to comply with the ISO standards on all the Quality tests and conduct failure analysis. The analysis showed the failure rate was highest in reach 1. It also identified that the Density tests in embankment work showed



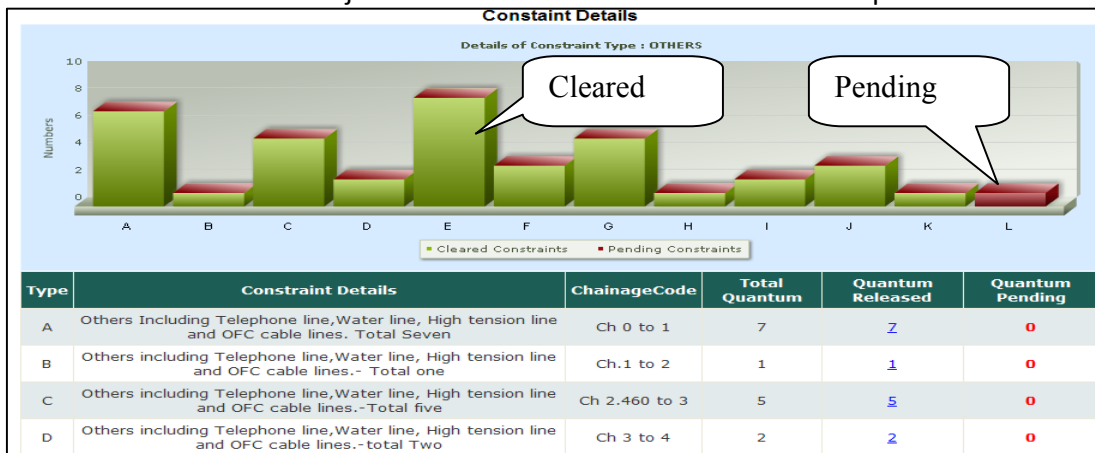
the maximum percentage of failure and also indicated the location of these failures.

The ready analysis available in the software helped them to decide that a particular borrow area being used for embankment works needed to be changed.

## Constraints

Various project constraint details could be highlighted and each constraint type could be monitored and the constraint clearance history could be traced for each location.

One of the major bottlenecks that the construction supervision team was



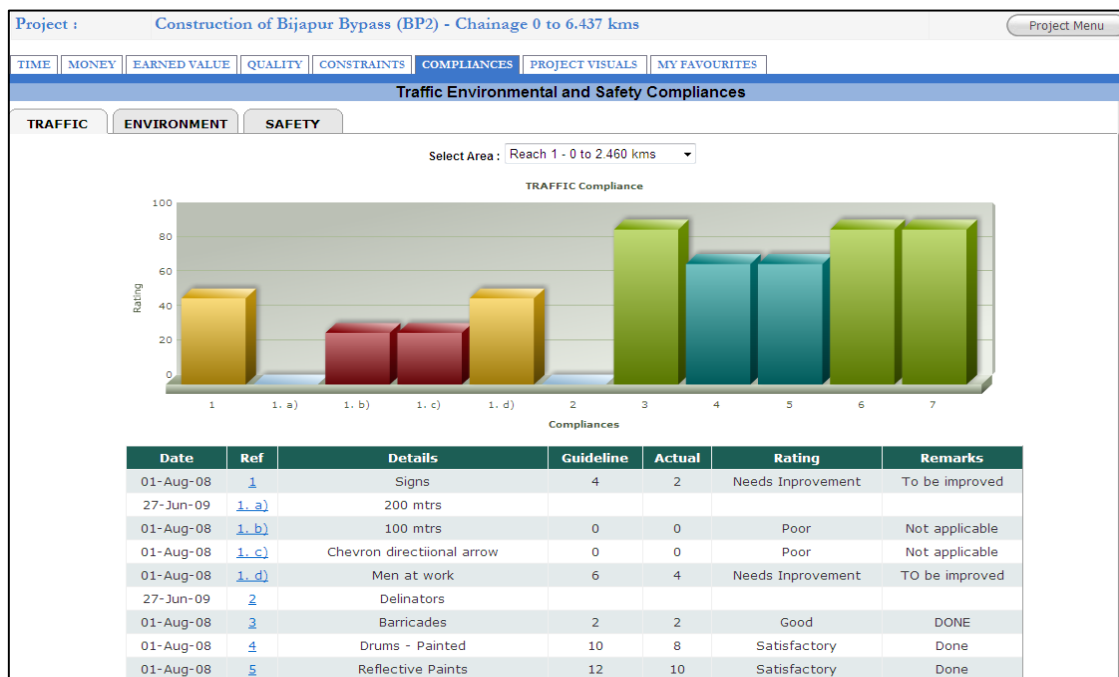
able to highlight was the High tension Lines present in the chainage km4 – km4.72 which was delaying the project progress. The contractors raised a claim for Extension of Time (EOT). Due to this constraint the completion of the project was delayed by 2 months.

## Compliances

KSHIP was also able to monitor the softer aspects of the project.

The construction supervision team was able to monitor the compliance details for Traffic diversion, Environment protection and Safety measurements. This ensured that the project working area was well indicated with sign boards and barricades, the workers working in the project were adequately protected with safety apparel and the environment was protected as per standards.

They were able to compare the compliances at the site within the parameters required



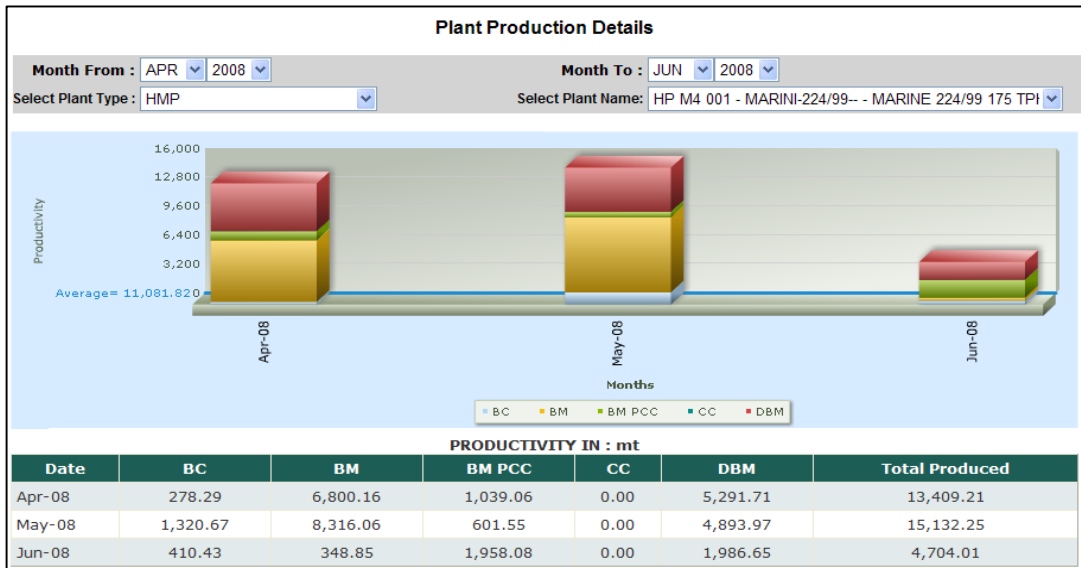
as per guidelines and specification. They were able to rate each compliance under traffic, environment and safety from a scale of 1 to 5 and specifying areas where improvement was needed with adequate remarks.

## Resource Monitoring

Backend Project Management System also provided enormous value for the contractors. The contractor could do his resource planning for the project using the same software. He could view his resource productivity and utilization details on daily basis and also compare daily resources productivity with theoretical productivity.

Plant and equipment breakdown and maintenance details were monitored. Analysis on worked hours, break down hours and idle hours for each equipment was available giving its utilization and productivity job-wise.

**Plant productivity:**

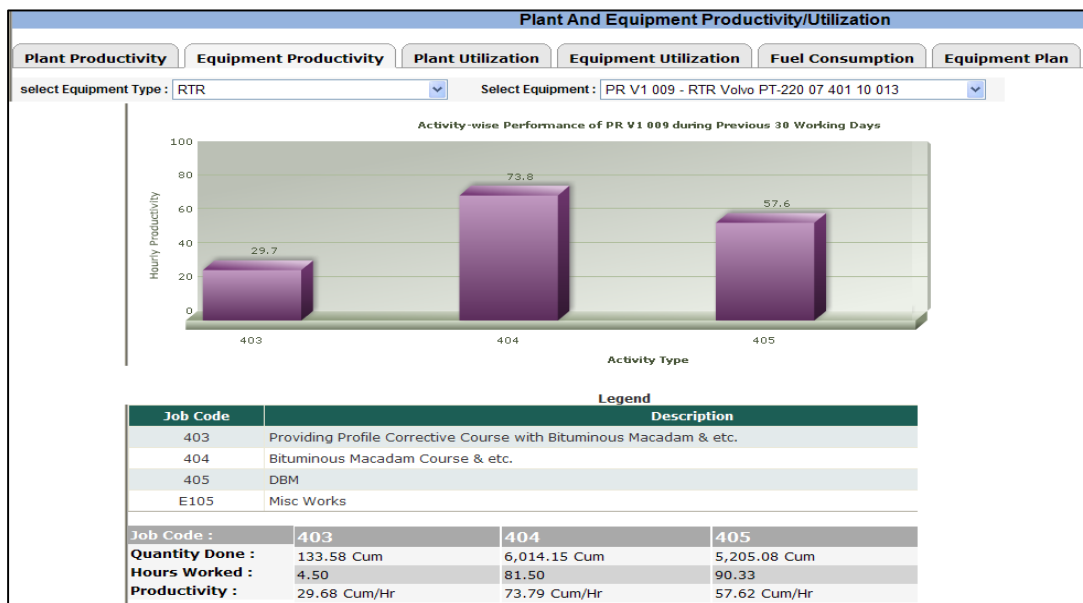


The Contractor could monitor the productivity for his hot mix plant on a daily basis, monthly basis with production and consumption details. He could view total Production, total hours worked, Average productivity for any selected plant.

Plant Performance	
Total Production :	79,447 mt
Total Hours Worked :	662 Hrs
Average Productivity :	120.02 mt/Hr
Average in last 30 days :	111.76 mt/Hr

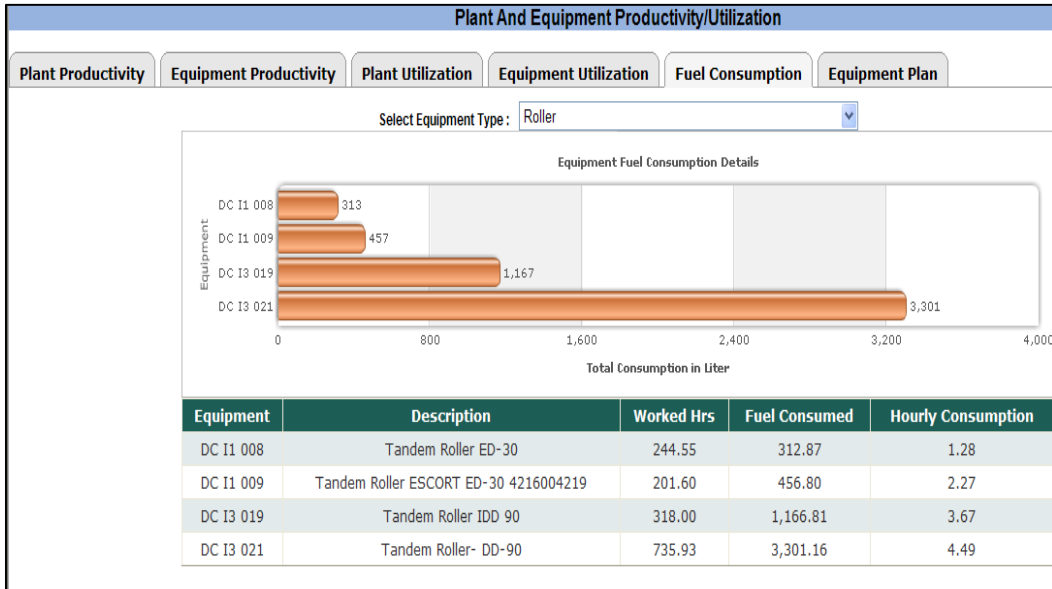
**Equipment productivity**

The Productivity of equipment against different activities during project execution was monitored by the contractor on a regular basis.



## Fuel Consumption

The overall fuel consumption for each plant and equipment details with per hour consumption details were monitored by the contractor.



## Visuals

The Progress photos of Bijapur bypass project were uploaded on Backend Project Management System regularly. KSHIP and other stakeholders were able to view the current progress visuals of the project.



The embankment erosion due to heavy rains is shown below in one of the progress



visuals. The Contractor raised a Variation Order to repair the damaged portion of embankment and a Claim for extension of time to complete the repair process. The Consultant, after investigation approved the variation order and the claim.

User : Koushik H		Project Name : Construction of Bijapur Bypass (BP2)		Logout		
Variation Order View						
VO No.	10					
VO Desc	Variation in the Embakement work due to embakement erosion					
Date Prepared	15-Mar-07					
Date Issued	30-Apr-07					
Ref Type	LETTER					
Ref No	4/30/2007					
Ref Date	4/30/2007					
Subject	Variation in the Embakement work due to embakement erosion					
Status	DRAFT					
Additional Value	17,488.05					
% of Contract Value	0.02					
Expended Till Date	4612999.4689					
Prepared By	Koushik H					
Approved By	--					
Date Approved	01-01-1900					
VO Status	Completed					
<input type="button" value="Add/Remove Items"/> <input type="button" value="APPROVE"/>						
BoqItemName	BoqItemDesc	BoqItemUnit	Quantity	Rate	Amount	Remarks
2.02	Embankment	Cu.m	185	94.53	17488.05	NA

## Reports

KSHIP was able to generate the required reports at any point of time during project execution of Bijapur bypass project with more than 100 ready reports to choose from in the software. The reports included Daily progress report [DPR], Monthly progress report [MPR], weekly progress report [WPR], financial progress reports, Quality Control reports, Compliance reports, Encumbrance or Constraints reports and other project related reports.

## Implementation Training and support

Backend Bangalore Pvt Ltd had implemented and trained the KSHIP staff with using Backend Project Management System in 10 days. Backend Bangalore Pvt Ltd and KSHIP worked together to ensure that existing data was uploaded onto the project management system. From then onwards, project management system was the default tool for managing the KSHIP project. To ensure that project members are adept at using the system, Backend Bangalore Pvt Ltd ran customized training modules for all participants and supplemented these with unlimited helpdesk and online support.