# Snapfile ONtrack: Using location-based reporting to accelerate BIM processes

Case Study

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| **Process** | Mobile field data capture to accelerate BIM |
| **Users** | c. 50 Balfour Beatty site engineers |
| **Hardware** | Standard smartphones and tablets with GPS, cameras and HTML5 certified browsers |
| **Technology** | HTML5 application |
| **Software** | Snapfile ONtrack |
| **Location** | M25 Motorway, Junctions 23-27 |

**Business Problem:**
Contractor Balfour Beatty sought to improve its capture and sharing of field data for use in building information modelling (BIM) by using mobile devices instead of paper-based methods.

**Business Solution:**
Snapfile ONtrack was trialled on a motorway widening project, where some 50 site engineers could capture site issues and progress using an HTML5 application on standard smartphones or tablets equipped with GPS and cameras. Data was secured in Snapfiles which could immediately be accessed by colleagues, including the project's BIM team. Real-time data capture and reporting saved three hours per week per user, delivering an overall saving of £250,000, in addition to the benefits of accelerating issue resolution.

## Background

Building information modelling (BIM) demands enhanced levels of collaboration and timely sharing of accurate information from initial design through construction to handover for future operation and maintenance. It also requires constant exchange of data between office and site - challenging on linear infrastructure projects during construction due to the dispersed nature of the workforce.



In recent years, UK contractor Balfour Beatty has sought to apply BIM approaches to many of its projects. On major projects such as motorways, the company's BIM manager for highways and infrastructure, Harry Parnell, identified in 2011 that slow identification and communication of site quality issues hampered timely resolution, and that a gap was apparent between site and office.
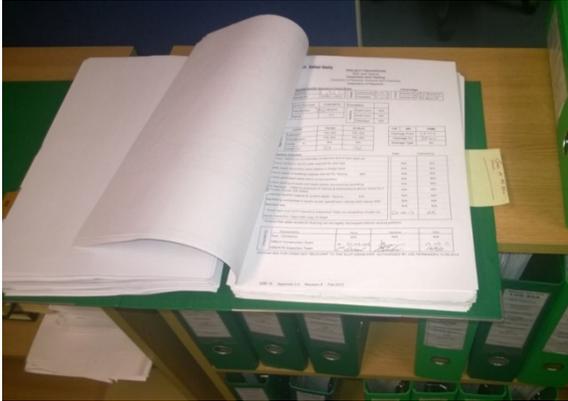


Existing processes were also delayed by poor location data. Often data had to be manually converted and associated with the model, which was time-consuming and prone to human error – and the issue is exacerbated when a highway project might disperse site staff over many kilometres of construction work.

**COMIT**

## Pre-existing Business Process



Conventional reporting of site issues would have involved site engineers recording handwritten details in notebooks, taking photographs, and marking locations on plan views of the works. The engineer would then need to return to a site office, transcribe these notes into an electronic form, find and attach the relevant photographs, and ensure the issue's location was correctly recorded. Parnell recalls:

> "When we started, coordinating site photographs with their exact locations in the 3D model was slow and laborious. We were using several tools and importing and exporting data and manually cutting and pasting between them. We wanted a more seamless way to quickly and accurately capture up to 40 different metadata attributes relating to a photo, so that, as section engineers identified issues, the data could immediately then be reused for checking, approval and electronic, rather than in-person, sign-off processes."

The process of capturing and reporting accurate site issue data also delayed rectification of the issues as work teams would move on to other tasks, and then have to return to resolve outstanding issues – which sometimes required additional road closures with corresponding inconvenience for road users.
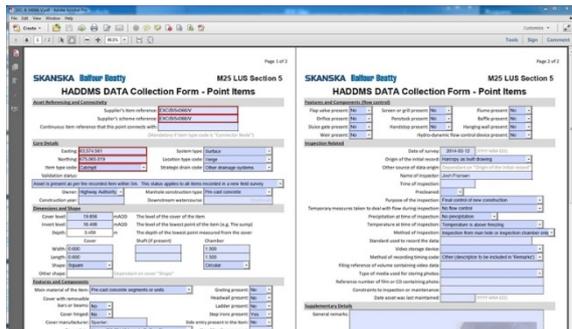


## The Solution

Balfour Beatty looked for mobile field data capture solutions that would enable them to share and capture data more efficiently and reduce the time spent travelling to and from the workplace: a more sustainable solution.

During 2013, Parnell and his Balfour Beatty BIM coordinator colleague Simon McGowen began working with Snapfile, testing a third-party mobile photo mapping application called GeoJot+ for site inspections on highway projects. They also trialled a related Snapfile product, fixON, which accurately stored the identity and location of existing assets without the use of QR codes.

Trialling GeoJot+ made Balfour Beatty one of the first UK highway contractors to connect geo-location services for defects data capture to its BIM data ecosystem.

While GoeJot+ showed promise, several shortcomings were identified during the trials; in particular, it was not very intuitive to use, which limited user adoption to around 10%. fixON, however was user-friendly and versatile, and accurate data could be made instantly available to other users.
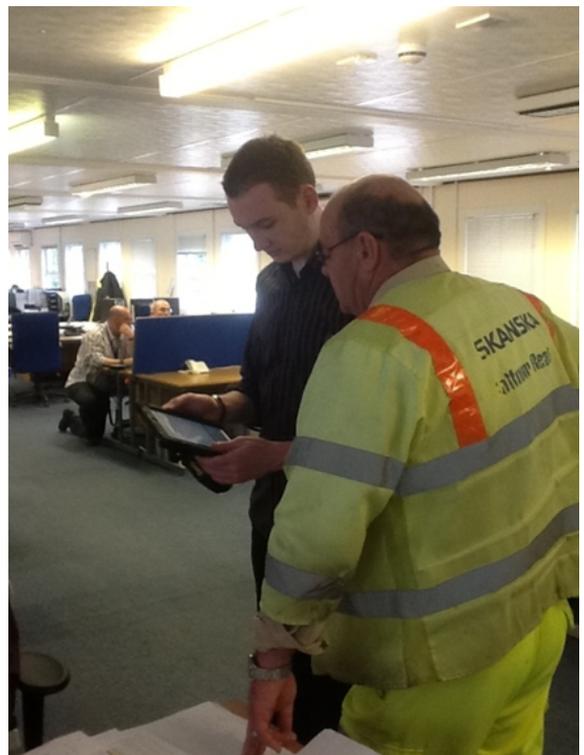
Undeterred by limited adoption of the initial application, Balfour Beatty committed resources to help Snapfile develop a more intuitive, accurate, secure and versatile real-time reporting application, combining and enhancing the functionality of the two tools. Snapfile consequently created a single enterprise-strength application, ONtrack, capable of being deployed across all Balfour Beatty highway-related projects.



ONtrack has two main components:

1. a mobile reporting solution written in HTML5, which can be downloaded to and accessed from any tablet or smartphone running a HTML5-certified browser, and

2. a Software-as-a-Service data management and reporting solution, hosted by Snapfile, that licensed users can access via a web-browser.

The application architecture is well suited to infrastructure projects and programmes, says Snapfile director Ed Williams:

> *"Being managed in a secure, cloud-based environment, the system is highly scalable. And by using unique IDs for numerous assets, it provides a convenient way for field*

*workers to share high quality, location-specific data in real-time with their BIM colleagues."*

## Implementation

Snapfile Ontrack was rolled-out on the M25 Section 5: J23 to J27 £208m joint venture with Skanska in Spring 2014. Over the course of five months, over 50 engineers and inspectors used the product to manage over 900 quality issues raised on-site.



Ease-of-use and versatility encouraged high user adoption by around 90% of the project team (compared to the 10% adoption achieved with GeoJot+).

From marker posts and signs to gantry elements (pile, pile cap, leg, boom), overbridges and culverts, around 1000 assets were each assigned a unique reference number, which was also captured in the 3D model. As work proceeded, issues – structural defects, missing signs, poor paint finishes – were photographed and their GPS locations could be fine-tuned using Google's Street View technology, incorporated in ONtrack's browser-based system.

Being written in HTML5, it also works across multiple mobile operating systems and devices. Parnell says:

> *"GPS accuracy was +/- 5m, so associating photographs gave a clear visual confirmation of each asset's exact location. Using ONtrack saved, on average, three hours every week per person. New issues were raised at evening coordination meetings, allocated to the relevant section staff, and once rectified could be checked and closed-out."*

## Post-solution Business Process

Certainty regarding defect closure was vital as rectification of a problem after traffic management had ended would cost over £10,000, versus the average £690 if traffic management was still in place (this disregards the further hidden costs of lost knowledge due to dispersal of the team to other projects and archiving of data).

During the pilot, Balfour Beatty staff helped Snapfile refine ONtrack so that its capabilities can embrace other infrastructure work. By deploying a single data capture and reporting system across all of its projects, Balfour Beatty can ensure high levels of data consistency and quality, and can standardise cross-project reporting for group quality, health and safety and environmental purposes.

Moreover, ONtrack's secure, time-, date-, location-stamped and tamper-proof Snapfile™ format provides reassurance to compliance teams in the event of any dispute or claim.

## Benefits

The M25 Section 5 team delivered the project 26 weeks ahead of schedule and under budget, while using ONtrack to work more efficiently and capture data once.

ONtrack's real-time reporting accelerated and improved the quality of collaboration between site and office-based staff and ensured no issues remained 'live' prior to the removal of traffic management measures saving approximately £200,000 against comparable projects.

From a survey of ONtrack users, Parnell also calculated an average saving of three hours a week per person, saving approximately £250,000 against comparable projects.

Clients such as Highways England also get richer, more accurate, real-time data about their new highway assets. As a result, ONtrack use was extended to other Balfour Beatty highway construction projects during late 2014, and to highways maintenance projects including its Scotland Transerve term contract where it will manage over 250,000 roadside assets.

SNAPFILE IDs : 40, 38

OVERVIEW : Scotland TranServ Manholes (M77)
Status: New and Inspected
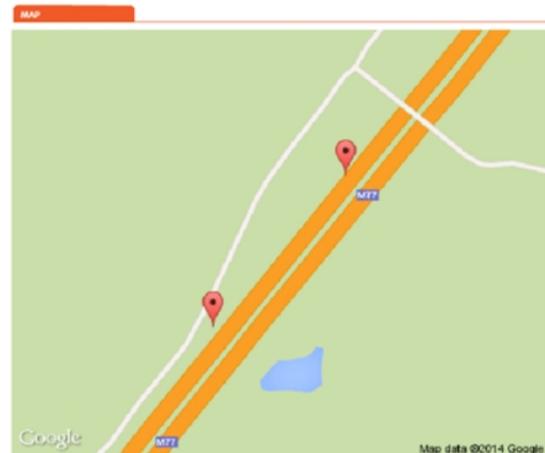


## Return on Investment

Balfour Beatty entered into a contract with Snapfile valued at around £100,000 for the solution. During the two year period of the project, use of Snapfile delivered some £500,000 in savings – a return on investment of 5:1 ROI, with initial payback in under six months.