



Case Study 1: Drone Roof Survey for Heritage Property in Wooler, Northumberland

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1. Introduction

Roof inspections are a critical part of property maintenance, traditionally performed by professionals using ladders, scaffolding, or cherry pickers. These methods, however, can be risky, time-consuming, and expensive, particularly when dealing with fragile or hard-to-reach structures. The advent of drone technology has revolutionised the way roof surveys are conducted, offering a safer, faster, and more cost-effective solution. This case study explores a drone roof survey conducted on a heritage property with a red pantile roof in Wooler, Northumberland.



2. Background

The property in question is a historic building featuring a red pantile roof, a type of roofing material known for its distinct curved shape and historical significance. Red pantiles are common in certain regions of the UK, particularly in older buildings. However, these tiles are fragile and prone to cracking or displacement over time, making regular inspections crucial to maintaining the roof's integrity.

Traditional methods of inspecting such roofs involve physically accessing the roof, which can be risky due to the tiles' fragility and the height of the building. Additionally, scaffolding or ladders can pose a safety risk to inspectors and may even cause additional damage to the roof.

This customer had recently instructed a local contractor to renew the sarking felt, recover the roof with the original red pantiles and renew the mortar fillets around the chimney and the abutments. The purpose of this survey was a quality inspection, to check the quality of the installation carried out.

3. Project Objectives

The primary objective of the drone roof survey was to:

- Conduct a comprehensive inspection of the red pantile roof.
- Identify any potential issues, such as cracked, displaced, or damaged tiles.
- Provide the property owner with a detailed report that could inform maintenance and repair decisions.
- Reference the quality inspection report to BS 5534:2014 Slating and tiling for pitched roofs and vertical cladding – code of practice (+A2:2018)
- Avoid causing any further damage to the roof during the inspection process. This was critical as we commenting on the quality of works following works being completed on the property.

4. Challenges

The project presented several challenges:

1. **Fragility of the Roof:** Red pantile roofs are delicate, and any physical contact during an inspection could potentially cause damage.
2. **Height and Accessibility:** The building's height made traditional inspection methods both dangerous and difficult.
3. **Weather Conditions:** Northumberland's weather can be unpredictable, with high winds and rain potentially affecting the quality of the survey and the safety of the drone operation.

5. Solution: Drone Roof Survey

Given the challenges, a drone roof survey was deemed the most appropriate solution. The drone used for this survey was equipped with a high-resolution camera capable of capturing detailed images and videos from various angles.

Key Features of the Drone Survey:

- **High-Resolution Imaging:** The drone captured high-quality images that allowed for close examination of the roof tiles. The images could be zoomed in without losing detail, making it easier to identify even minor issues.
- **Multiple Angles:** The drone could access angles and perspectives that would be difficult or impossible to achieve with traditional inspection methods. This included capturing images of the roof's ridges, valleys, and chimneys.
- **Real-Time Monitoring:** The drone survey provided real-time footage, allowing the surveyor to assess the roof's condition immediately and adjust the inspection process as needed.

- **Non-Invasive:** The drone never made contact with the roof, ensuring that the inspection did not cause any additional damage, which was a key requirement of the drone roof survey as it was a quality inspection

6. Execution

The drone roof survey was carried out by a team of certified drone operators and roofing specialists. The process involved several steps:

Pre-Survey Assessment: The team conducted an initial assessment of the property to identify potential hazards, such as overhead power lines or trees, that could interfere with the drone's flight.

Flight Planning: A detailed flight plan was created, specifying the drone's flight path, altitude, and the specific areas of the roof to be inspected. Weather conditions were also monitored to ensure safe flying conditions.

Survey Execution: The drone was deployed and flown over the roof, capturing high-resolution images and videos from various angles. The survey was completed in less than an hour, significantly faster than a traditional inspection.

Data Analysis: The collected data was analysed by roofing specialists, who identified areas of concern, such as cracked or displaced tiles, and prepared a comprehensive report for the property owner.

7. Results

The drone roof survey successfully identified several issues with the red pantile roof:

- **Cracked Tiles:** A number of tiles were found to be cracked, likely due to weathering and age. These were flagged for replacement.
- In this situation we found that while the roof was largely structurally sound and watertight, the quality of workmanship aesthetically was poor, which was disappointing to ourselves and the homeowner.
- The property owner was provided with a detailed report, including high-resolution images and recommendations for improvement.

8. Benefits of Drone Roof Surveys

This case study highlights several key benefits of using drones for roof surveys:

- **Safety:** The drone survey eliminated the need for inspectors to physically access the roof, reducing the risk of falls and accidents. This is particularly important when dealing with fragile or hard-to-reach roofs.

- **Speed:** The survey was completed in a fraction of the time it would have taken using traditional methods, minimizing disruption to the property owner.
- **Cost-Effectiveness:** By avoiding the need for scaffolding, ladders, or cherry pickers, the drone survey was more cost-effective. Additionally, the detailed data provided by the drone allowed for targeted repairs, potentially saving the owner money in the long run.
- **Precision:** The high-resolution images and videos captured by the drone provided a level of detail that is difficult to achieve with traditional methods. This precision is particularly valuable when inspecting fragile or intricate roofs.
- **Non-Invasive:** The drone survey was entirely non-invasive, ensuring that the inspection process did not cause any additional damage to the roof.

9. Lessons Learned

The success of this drone roof survey offers several lessons for future projects:

- **Pre-Survey Planning is Crucial:** A thorough pre-survey assessment and detailed flight planning are essential to ensuring a safe and effective drone survey. This includes assessing potential hazards, monitoring weather conditions, and establishing clear objectives for the survey.
- **Technology Enhances Traditional Expertise:** While drone technology provides the tools for a more efficient survey, the expertise of roofing specialists remains crucial in analysing the data and making informed recommendations.
- **Adaptability:** The ability to adapt to changing conditions, such as weather or unexpected issues, is key to the success of a drone survey. Real-time monitoring allows for adjustments to be made during the survey, ensuring that all necessary data is captured.

10. Conclusion

The drone roof survey conducted on the red pantile roof in Wooler, Northumberland, demonstrates the significant advantages of using drone technology for property inspections. By providing a safer, faster, and more cost-effective method for assessing roof conditions, drones are transforming the way roof surveys are conducted.

This case study serves as a compelling example of how drone technology can be effectively applied to heritage properties, where traditional inspection methods may pose risks to both the structure and the inspectors. As drone technology continues to advance, it is likely to become an increasingly important tool in the field of property maintenance and inspection.

Finally, if workers are to venture onto a roof it needs to be for a good reason, as working at height can be dangerous, using drones to carry out roof surveys is the safest way to do this. Surveyors have been looking at roofs with binoculars for many years, but the aerial perspective ensures that no area or detail is missed.

11. Reviews

- a) **Linda Witson (Homeowner):** Great service. Professional & friendly. We had a roof survey carried out. The report was concise and thorough. Very high-quality images, covering all aspects of the roof & gutting etc. I would recommend to others.
- b) **Brian Watson (Linda's Protective Big Brother):** Richard and his service were simply brilliant. His customer service, friendliness and quality of report were perfect. Highly recommended.

Source: Google Reviews

12. Further Reading

1. The law around drones can seem scary for new operators, but the Civil Aviation Authority does give a good level of information on their website: <https://www.caa.co.uk/drones/>
2. The Royal Institute of Chartered Surveyors has an interesting article from one Chartered Surveyor, who has just started utilising drones for property and roofing surveys. Please see the link: <https://www.rics.org/news-insights/come-fly-with-me>
3. Carrying out Drone Roof Surveys, can be daunting and getting high quality actionable data is important in carrying out a drone roof survey. Here Hammer Missions talks about the first steps in carrying out a drone roof survey: <https://www.hammermissions.com/post/how-to-do-a-roof-inspection-using-a-drone>
4. For some useful information on roofing please visit The National Federation of Roofing Contractors: <https://www.nfrc.co.uk/>
5. DJI, The maker of our drones have an interesting blog post on the how to perform a drone roof inspection: <https://enterprise-insights.dji.com/blog/drone-roof-inspections>
6. Check out of recent blog post - **Drone Roof Surveys: A Guide Of How To Carry Out A Roof Inspection:** <https://lithos-skyline.co.uk/blog/f/drone-roof-surveys-a-guide-of-how-to-carry-out-a-roof-inspection>
7. Are you interested in a quote for a Drone Roof Survey then have a look at Local Surveyors Direct, who have links with numerous companies carrying out roofing inspection across the country: https://www.localsurveyorsdirect.co.uk/drone-roof-surveys?gad_source=1&gclid=Cj0KCQjwveK4BhD4ARIsAKy6pMI3QrkHn6dQZYMMyAeyvRw7XcDCxnaT1qBf2xn6pIBzc_s6Qfl8MlmoaAvEeEALw_wcB

