OKLAHOMA DEPARTMENT OF TRANSPORTATION

HeadLight Pilot Evaluation Report | May 2021

HEADLIGHT®

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Table of Contents

Executive Summary

The Oklahoma Department of Transportation (ODOT) is responsible for managing over 500 projects statewide, and a budget of over $1.7 Billion statewide annually. The current project delivery effort involves many stakeholders internally within ODOT as well as externally.

ODOT has always looked towards innovation as a way to achieve organizational goals. Key goals focused on during this pilot study include increasing visibility/transparency, improving clarity and open communication, boosting team performance, enabling new talent, future proofing technology investments, and further supporting safety as a top ODOT priority.

This pilot study explores the feasibility of leveraging a cloud-based, mobile project inspection technology named HeadLight as a means to drive positive impact towards ODOT's organizational goals. Through the pilot findings, ODOT was able to successfully demonstrate an improvement in outcomes that correlate to achieving those organizational goals.

Visibility and transparency can be improved with more and better project data collected daily on job sites and shared quickly and easily. The project teams during the pilot deployments collected over 1.69x's the contextual data and over 1,265 more photos and videos than compared with the existing process over a similar sample size.

The ability to share that information, including visual data, is a key element to improving communication. The availability of this data for stakeholders in near real time was observed by project teams to improve stakeholder communication. Among pilot participants, 74% found it easier to share information using HeadLight compared to their traditional process. And on time submission of completed reports increased by 85% using HeadLight as compared to ODOT's traditional method.

Visual data was supported by pilot participants as important to collect during project activities, and would help ODOT in the event an issue was escalated. Additionally, pilot participants agreed that visual data would help to avoid potential claims altogether. With ODOT's traditional methods, users rarely included visual data in the project record via daily reports vs. when using HeadLight, 83% of users included visual data as part of their reporting.

Team performance improved by making searchability of both written and visual inspection data more efficient. HeadLight reduced the amount of effort required by project teams to recall and find critical information. DWRs were automatically generated from daily observations, eliminating omission and transcription errors. Additionally, office users reported that HeadLight reduced their need to visit the jobsite as frequently. There was not, however, an efficiency increase for field users submitting daily reports using HeadLight. This was due to manual transfer of data from HeadLight into ODOT's legacy contract administration system during the pilot.

To support enabling new talent, data stored in HeadLight provides a wealth of material for future training of new employees and even training of existing employees for particularly unique

construction scenarios. Additionally, getting new team members up to speed quickly will be important. The majority of pilot users, 81%, remarked that they were able to quickly become comfortable using HeadLight vs. 27% with the traditional process.

ODOT's culture of safety would also be further supported by the use of HeadLight. A majority of pilot participants, 67%, agreed that HeadLight would allow the Department to capture more comprehensive documentation for work zone safety conditions and traffic control than the traditional process.

Background

ODOT has always looked towards innovation as a way to achieve organizational goals. This effort was undertaken to specifically help capture some key opportunities that the Department identified within its construction project delivery process.

The business case study documents a pilot program executed within ODOT's construction division to understand its traditional business process, baseline its outcomes, and deploy a new business process leveraging a photo-based inspection technology, HeadLight, to compare how deploying this technology across multiple projects would impact ODOT's ability to deliver consequential improvements across several key value focus areas.

Objectives and Impacts Identified

Following discovery conversations conducted with the ODOT executive team, construction leadership, division engineers, and contractors within Oklahoma, the following objectives were identified as priorities across the team in order to evaluate how HeadLight can benefit the Department:

Increase transparency/visibility

- Increase transparency and visibility not only within ODOT teams, but also externally to stakeholders including legislators, transportation commission, governor's office, contractors, consultants, and the public.
- **Impact**: Based on participant interviews, an increase in transparency and visibility translates to an increase in both credibility and accountability. These two characteristics were universally identified as of critical importance to stakeholders within ODOT and external to ODOT. This impact would proactively avoid concerns about ODOT's use of resources as well as showcase value that ODOT provides both to the legislature and the public.

Improve clarity and open communication

- Alleviate gray areas with contractors/stakeholders during project execution by sharing access to project information quickly and communicate early and often when changes arise.
- **Impact**: The impact identified by participants includes an improvement to an already strong relationship with the industry. Also identified was the potential cost benefit that comes with streamlining communication as risks that previously needed to be priced into bids are reduced. And lastly, with tighter, more effective and clear communication enabled between ODOT and its industry partners, issues can be resolved swiftly and effectively.

Boost team performance

- By providing easy to use capabilities, the administrative burden on project teams is reduced, which makes it easier and more achievable for ODOT's project teams to do a great job in what is an important and difficult set of roles.
- **Impact:** Project team productivity will see a significant boost with easy to use, searchable, data-first documentation with seamlessly incorporated images/video. Duties can be completed remotely vs. coming to the office or requiring extra time in the truck filling out project documentation.

Enable new talent

- A challenge with resource turnover was identified, driving the need for effective training capabilities as well as effective collaboration capabilities.
- **Impact:** By improving training and collaboration capabilities with the tools that project teams use, such as just in time training available on mobile devices, ODOT new hires can contribute immediately on the job. Additionally, consistency will improve by making best practices, as defined by ODOT, easily accessible in the field by project teams. With effective collaboration tools, experienced personnel can be a resource for multiple field inspectors remotely. The system also allows a supervisor (resident engineer or assistant) to monitor from the office what the newly hired inspector is capturing in the field and enables coaching opportunities to the new hires without having to physically be on the job site.

Future proof technology investments

- Ensuring that ODOT's technology investments continue to serve the agency over the next 5 to 10 years was identified as a focus area during participant interviews. Flexibility and openness in selected innovation will allow ODOT to evolve and grow to meet the challenges ahead.
- **Impact**: By selecting technology that has, in its core design, an inherent way to share data securely with other systems, ODOT secures the ability to plug in new technologies that emerge over the coming 10 year period. A "unified database" approach will become obsolete almost immediately due to inflexibility and closed approach. Additionally, a different kind of innovation, that of contract delivery methods, can be supported with technology that has inherent flexibility to support not only traditional Design-Bid-Build, but Design-Build, CMAR, A+B and whatever new contract delivery methods that may emerge over the next 10 years.

Safety

- Safety is a top priority for ODOT and its partners. By providing easy to use, comprehensive documentation tools for project teams with real-time information sharing, work zone safety conditions can be quickly verified and corrections made if necessary.

- **Impact:** The impact identified during participant interviews of having timely, comprehensive work zone safety and traffic control information would be a reduction of injury and loss, both for workers on site and for the traveling public.

Key Measures

In order to evaluate the impact of HeadLight and the objectives identified above, the following were identified as key measures to track with a balance of both quantitative and qualitative factors as compared to traditional methods:

Value Theme	Pilot Measures
Transparency/Visibility	● Volume of information collected ● Timeliness of information availability ● Ease of information access
Clarity and Open Communication	● Quantity of visual evidence ● Number of observations taken ● Qualitative feedback from user use cases ● Timeliness of information availability to contractors
Team Performance and Efficiency	● Time spent creating documentation ● Time spent finding information ● Volume of information collected ● Time on site pre and post HeadLight
Talent	● Time to proficiency with software ● Qualitative feedback from user use cases ● Consistency of data captured and report completeness
Future Flexibility	● Interoperability of data and system ● Feasibility of use on additional project types
Safety	● Comprehensive documentation of work zone safety and traffic control ● Quantity of visual evidence for safety related items ● Timeliness of information availability

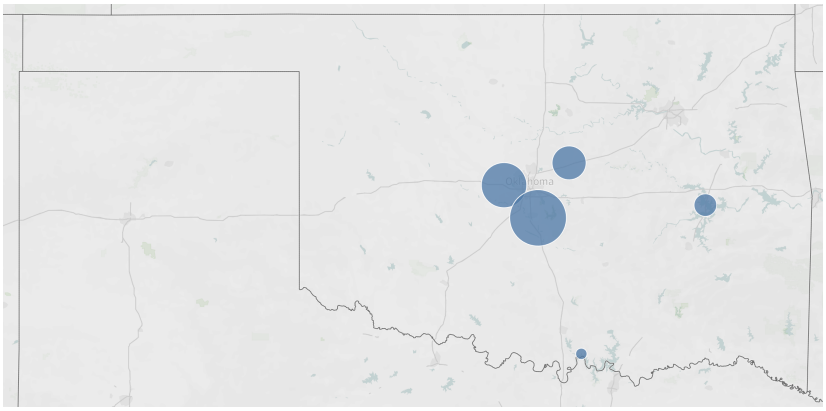
Approach

To evaluate ODOT's long term objectives, a set of pilot projects were identified to allow the ODOT team to:

- Familiarize itself with photo-based inspection technology and the use of HeadLight
- Identify how photo-based inspection technology can be used within the Department's workflows and tools
- Evaluate impacts and benefits of using the technology as compared to traditional methods
- Determine overall business impact for use of HeadLight technology department wide

Projects

The Department identified a set of construction projects to evaluate the key objectives of this project as identified below.



Geographic locations of the pilot projects.

Project	Active
200229, STP-241C(059)PM: SH-66B Over Captain Creek, 1.5 Mi Northeast of SH-66	Sept. 9, 2020
200222, NHPPI-209N(078)PM: Frisco Road/I-40 interchange	Sept. 8, 2020
200200, US-69: From the SH-9 Junction, Extended North in Eufala	Nov. 16, 2020
200108, STP-243C(032)PM: SH-32 over Wilson Creek	Jan. 4, 2021
STP-214B(068)AG: 24th Avenue SE Improvement	Sept. 23, 2019

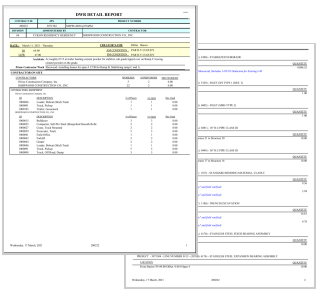
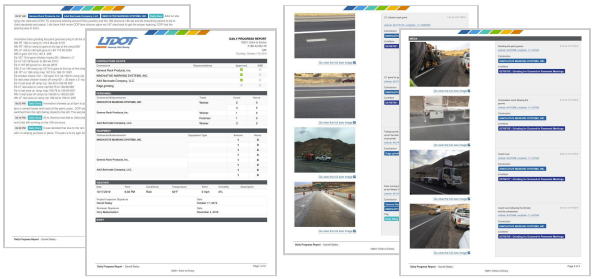
Participants

To properly evaluate the objectives, stakeholders from several key roles were identified to participate in order to evaluate impacts across the field documentation workflows.

Role	Description
Field Users	Inspectors and Transportation Technicians
Office Users	Engineers, Field Managers and Office Managers
Non-Crew Users	Headquarters personnel, Region Directors, District Engineers and other stakeholders (Structures, Contract Specialists, etc)
Contractors	Read Only access to select contractor personnel

Workflow

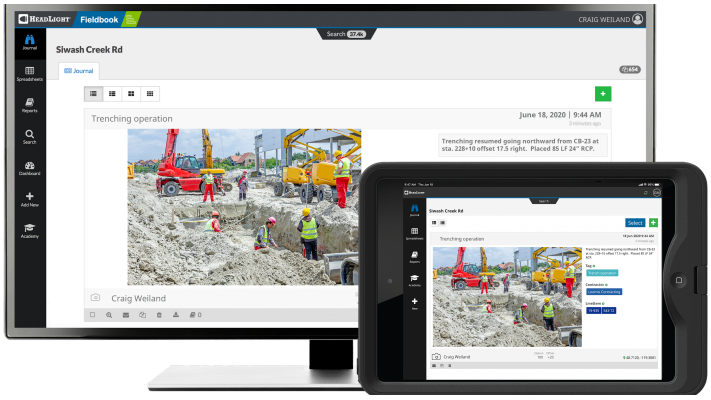
The following table describes the workflow used during this pilot by Field users as compared to the traditional process.

*PREVIOUS "Day in the Life"	*WITH HEADLIGHT "Day in the Life"
While in the field 1. Handwrite notes on project activity and in a notebook or enter on a cell phone app. 2. Handwrite notes on pay items quantities, equipment and personnel counts and in a notebook or type into a cell phone app. 3. Occasionally take pictures of project activity with a shared camera or personal cell phone and email to stakeholders. **Return to the office** 1. Download images from camera or phone to computer. 2. Type project notes into legacy system (SiteManager) 3. Enter work items, equipment and personnel into legacy system **Workday complete**	**While in the field** 1. Capture project notes, images, and video observations as they occur in the HeadLight app (voice-to-text option) and tap to tag additional details. 2. Enter pay items, equipment and personnel into HeadLight digital data collection spreadsheets directly. 3. From the iPad app, tap "My Daily" to create DWR. Open PDF to preview, then tap to submit DWR. **Workday complete**
 *Example output (SiteManager)*	 *Example output (HeadLight)*

**Note: For the pilot phase inspectors still were required to enter data into SiteManager directly. Thus, efficiency was not evaluated here. It is anticipated that ODOT would achieve similar efficiency gains as seen in LADOTD with a HeadLight <> SiteManager integration upon statewide deployment.*

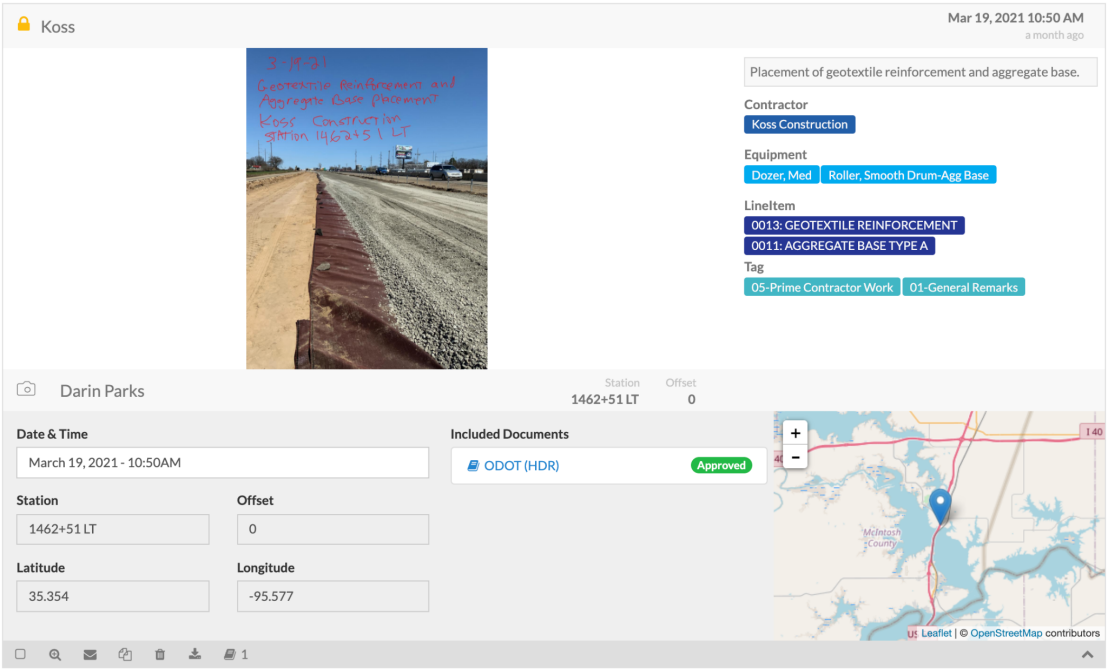
HeadLight

HeadLight, a photo-based project inspection technology, was chosen for evaluation based on prior user requirement research. HeadLight was provided as an application on the Apple iPad and available via a web-based interface.



Metadata and Spatial Data Captured

All data captured in HeadLight has specific location information, including GPS coordinates, that allows it to be searched, filtered, and analyzed spatially. Additionally, through the use of metadata tagging, the information captured contains a rich graph of relationships to project critical items and improves searchability.



Example of image observation captured in HeadLight containing annotations, tags, descriptions, and geospatial location. Additionally all related reports or documents that reference the observation are automatically linked.

Spreadsheets

HeadLight provides a configurable spreadsheet interface to allow inspectors to capture tabular data such as work item quantities, equipment, personnel as well as any ODOT specific parameters. This allows the data to easily transform into legacy systems.

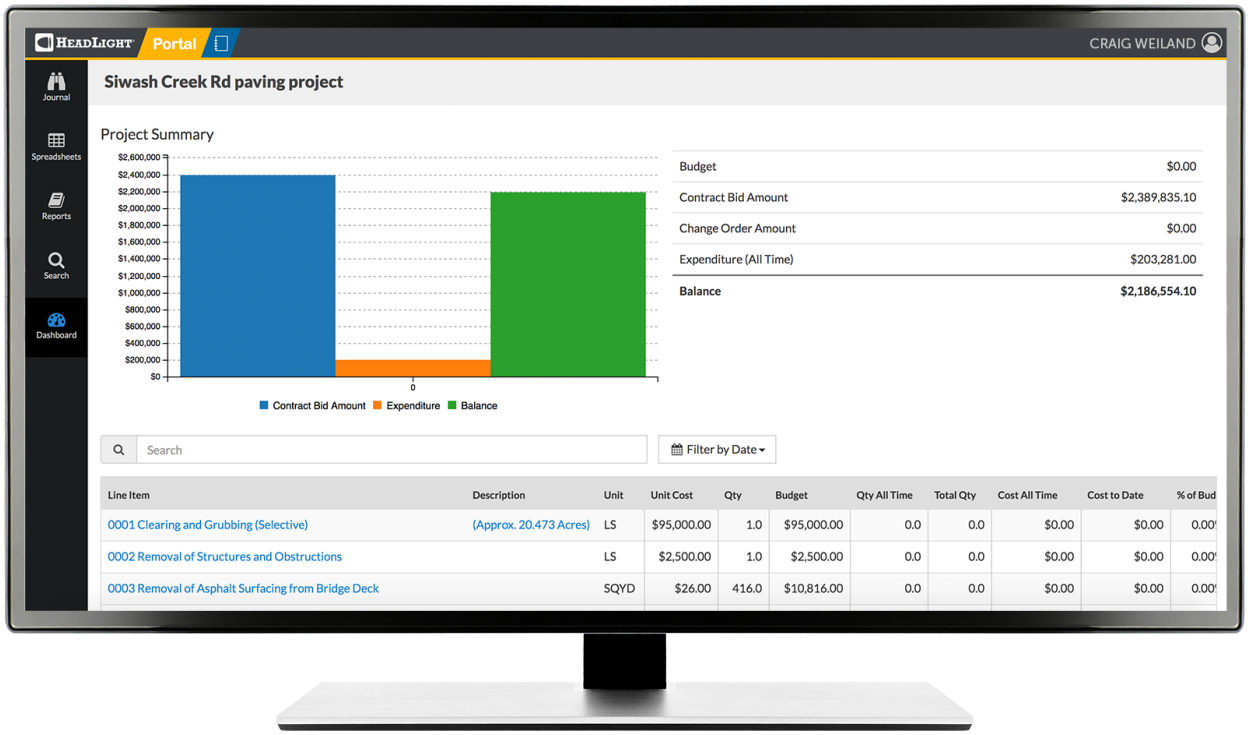
2021/04/12

Equipment	Nbr Pecs.	Nbr Used	Used Hrs.	Remarks	LineItem	Contractor	Tag
Concrete Crusher	1	0	0	Crushing concrete rubble for use in CTB	0012: CEMENT TREATED BASE	Mobicon Crushing and Recycling	07-Subcontractor Work
Excavators, Med	1	0	0	Crushing concrete rubble for use in CTB	0012: CEMENT TREATED BASE	Mobicon Crushing and Recycling	07-Subcontractor Work
Skid Steer	1	0	0	Crushing concrete rubble for use in CTB	0012: CEMENT TREATED BASE	Mobicon Crushing and Recycling	07-Subcontractor Work
Truck, PICKUP	1	0	0	Crushing concrete rubble for use in CTB	0012: CEMENT TREATED BASE	Mobicon Crushing and Recycling	07-Subcontractor Work
Skid Steer	1	0	0	Erosion control	0004: TEMPORARY SILT FENCE	Heartland Sod	07-Subcontractor Work
Truck, PICKUP	1	0	0	Erosion control	0004: TEMPORARY SILT FENCE	Heartland Sod	07-Subcontractor Work
Trencher	1	0	0	Erosion control	0004: TEMPORARY SILT FENCE	Heartland Sod	07-Subcontractor Work
Roller, Smooth Drum-Agg Base	1	1	10		0011: AGGREGATE BASE TYPE A	Koss Construction	05-Prime Contractor Work
Dozer, Med	1	1	10		0011: AGGREGATE BASE TYPE A	Koss Construction	05-Prime Contractor Work
Loader, Front End	1	1	10		0024: P.C. CONCRETE FOR PAVEMENT	Koss Construction	05-Prime Contractor Work

Screenshot of the tabular interface for data collection within HeadLight.

Portal

To increase communication and transparency, HeadLight Portal was set up for contractors and other stakeholders. Portal provides customers a tool to allow users to have read-only access to project information. Often these users are outside of their organization but require ongoing status updates of project information. Portal can allow for either high level project data in the form of approved reports and forms or as granular observation level data access.



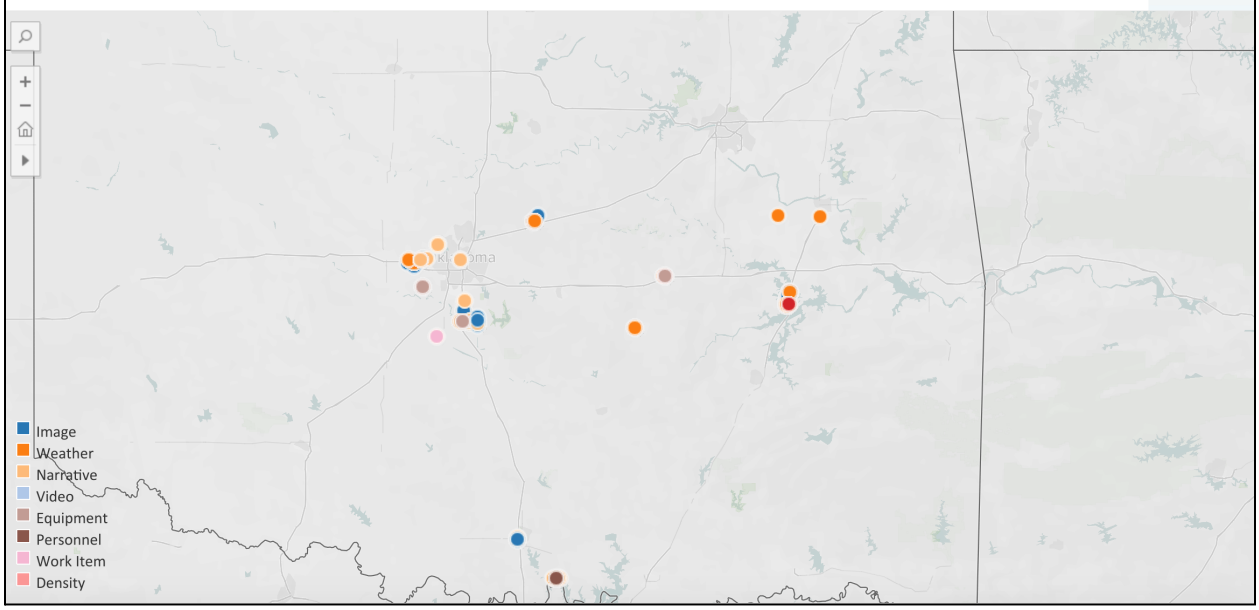
Results

The following results were tabulated from data collected from the HeadLight system directly, a pre/post user survey, user feedback and analyzing traditional reports and workflows at ODOT. They are organized by value theme with the key metric results identified.

By the numbers

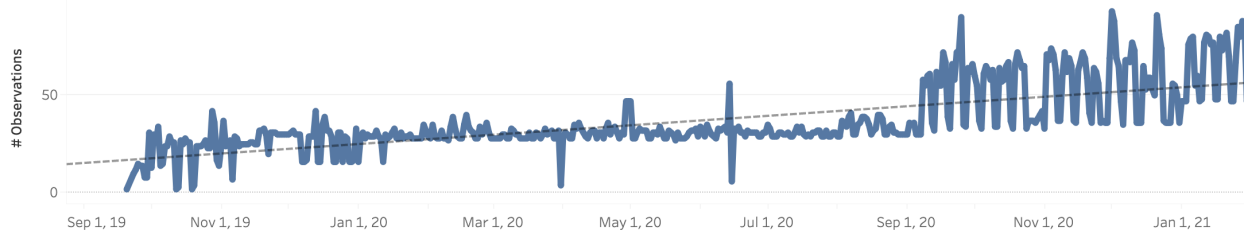
ODOT continues to be active on all 5 projects and overall field users captured over 17,851 total observations, 1,245 images, and 40 videos through March of 2020 based on their project start timings noted below. They have completed and approved over 838 daily reports using HeadLight in that same time.

Images	Videos	Weather	Narratives	Start/Stop	Traffic	WorkItems	Equipment	Personnel	TOTAL
1,245	40	92	841	8	47	7,033	5,297	2	17,851



Screenshot of spatial dashboard showing locations of all pilot observations and observation types.

Adoption and usage continue to grow over time amongst the inspectors and the time to value - or first report generated - has been observed as immediately following training.



Trendline of usage over time across the pilot projects. Usage was observed to grow over time.

Transparency/Visibility

- Office users reported an increase of 85% in access to completed reports the same day using HeadLight as compared to using the traditional method.
- 90% of pilot participants either strongly agree or agree that having access to a time-stamped digital record with images, tags, and a description that gives real-time status on a project with HeadLight any time it is needed helps communicate details on a project to both field and office personnel.
- 81% of pilot participants reported that the ability to share almost real time, read-only access to projects with management inside and contractors outside the organization would increase communication and transparency.
- 70% of pilot participants found it very easy or easy to locate/access notes, images and/or videos,created by themselves or another coworker, related to a specific project activity or issue.

Related User Comments

“It's easier to share information with those who have HeadLight. I mean, you've got the photos and everything attached to it, all there in one document. It's not having to find multiple areas.**”**

- **Chris Fuhrmann, Resident Engineer**

“It's just nice to be able to have a picture of something that you did for somebody else to be able to see without them having to call you and make you describe it, or having to take a picture on a cell phone and send it through text.**”**

- **Jonathan Alexander, Inspector**

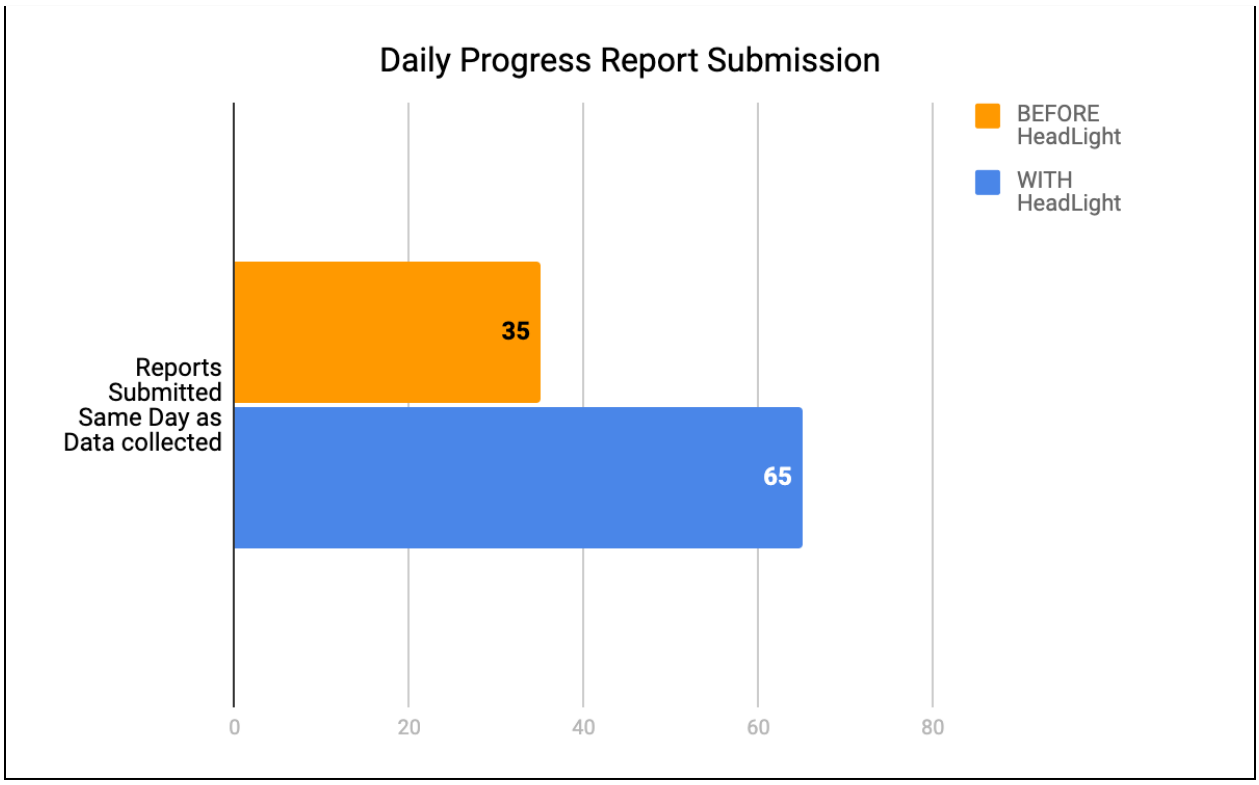
“I can present a report to my boss and I can have real time information right then and there, instead of waiting an hour later or 30 minutes or however, end of day, however long it would take.**”**

- **Shawn Riblet, Inspector**

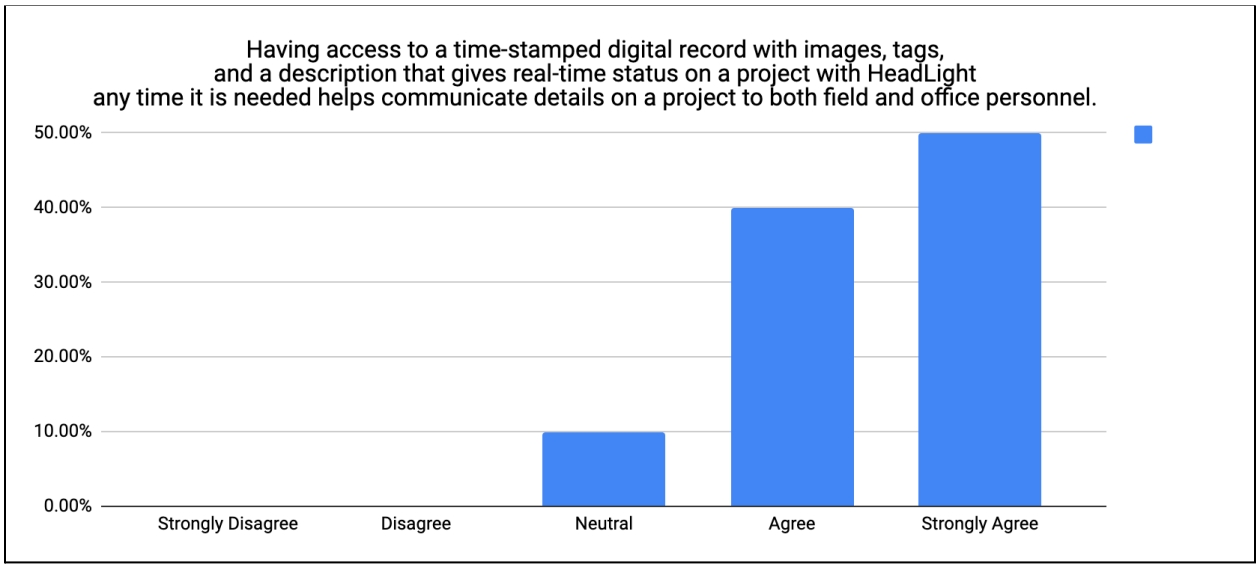
“HeadLight is very good. It's way easier to be able to just send a PDF with all the details of information to someone and it creates a detailed picture of what they need.**”**

- **Uriah Nichols, Resident Engineer**

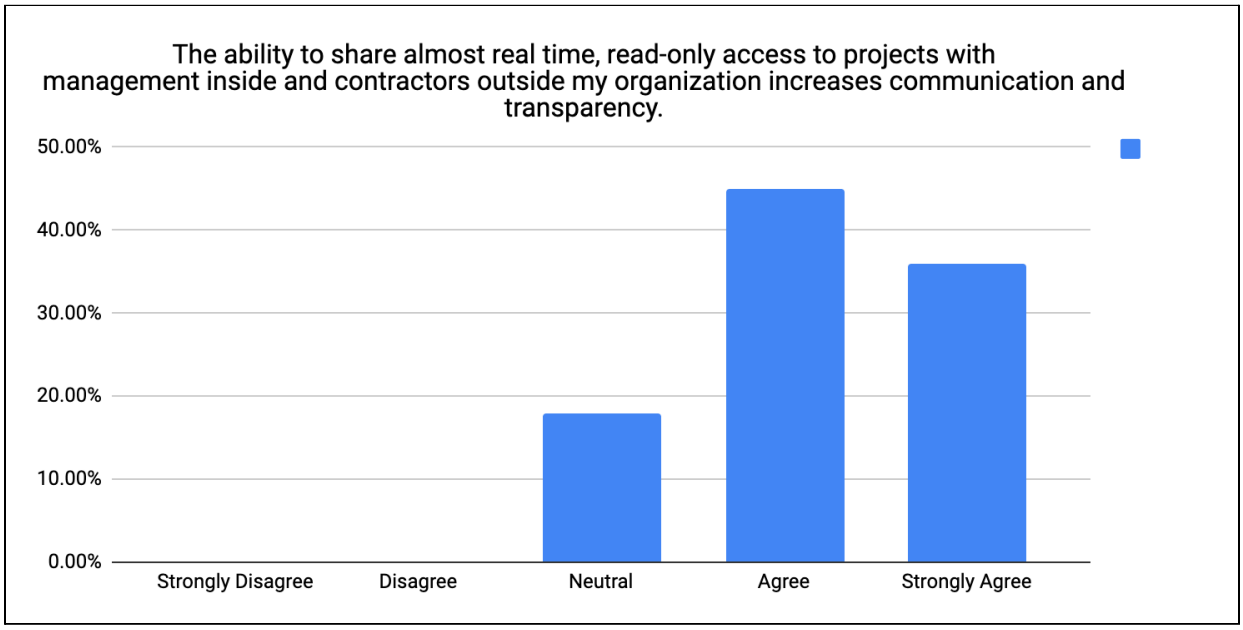
Survey Results



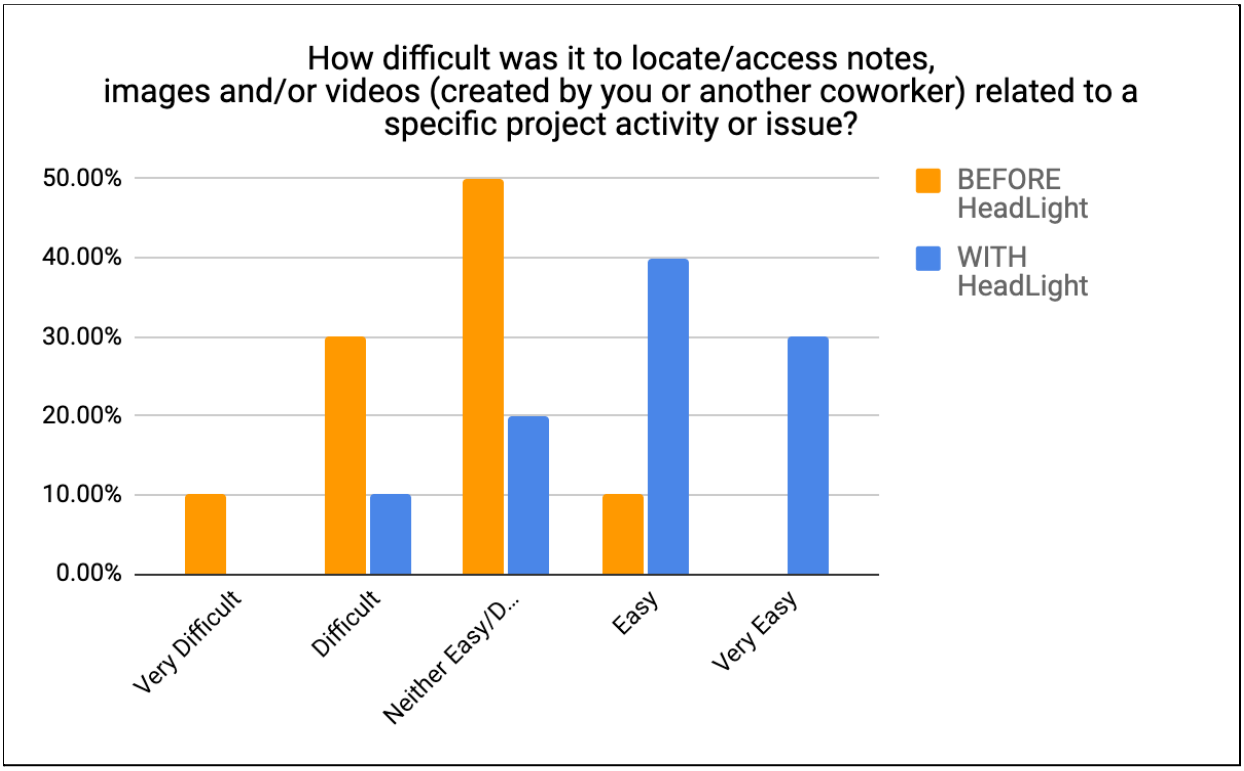
Result: Office users reported an increase of 85% in access to completed reports the same day using HeadLight as compared to using the traditional method.



Result: 90% of Headlight users strongly agree or agree that having access to a time-stamped digital record with images, tags, and a description that gives real-time status on a project with HeadLight any time it is needed helps communicate details on a project to both field and office personnel.



Result: 81% of users felt that the ability to share almost real time, read-only access to projects with management inside and contractors outside the organization would increase communication and transparency.



Result: 70% of Headlight users find it very easy or easy to locate/access notes, images and/or videos, created by themselves or another coworker, related to a specific project activity or issue.

Clarity and Open Communication

- Users rarely attached images to a daily report using the traditional method compared to more than 83% of users almost always/always attaching an image to daily report using HeadLight.
- 90% of users strongly agree or agree that if they were to become involved in an escalated issue, HeadLight would help them resolve it.
- 90% of users strongly agree or agree if they became involved in a potential claim dispute, they could see HeadLight being used to avoid it.

Related User Comments

"The quality of information is definitely more complete. Photos are worth a thousand words and, you know, it's still getting them to do it. I can look at it (HL) every day and say, "Hey, why aren't we taking any photos?" Just having it all there and being able to search it and seeing what one contractor was doing versus the other, or seeing everyone, altogether it can be manipulated in any way to see how I want to see it.**"**

- **Chris Fuhrmann, Resident Engineer**

"If we have more information, we have more facts, more detailed pictures and things like that. We'd be more likely to be able to avoid a claim.**"**

- **Uriah Nichols, Resident Engineer**

"We have an issue where we had a concrete paving job and we're having separation in the paving in the center line where the two sides. We had an issue with the contractor and in our inspection, we realized that the wires weren't stuck yet, that the contractor still had not applied enough Oxy on the rebar in those areas. I was talking with my resident engineer today, who was talking about how helpful it would have been to have a program like HeadLight, where we could have documented and have everything in one spot and conversations with contractors. We didn't have all of that. So a lot of the documentation that we have is lost or is real hard to backtrack and locate where I think having this, it would've made a big difference in this step. One area we're trying to show our proof and had the documentation needed.**"**

- **Ryan Sullivan, Project Manager**

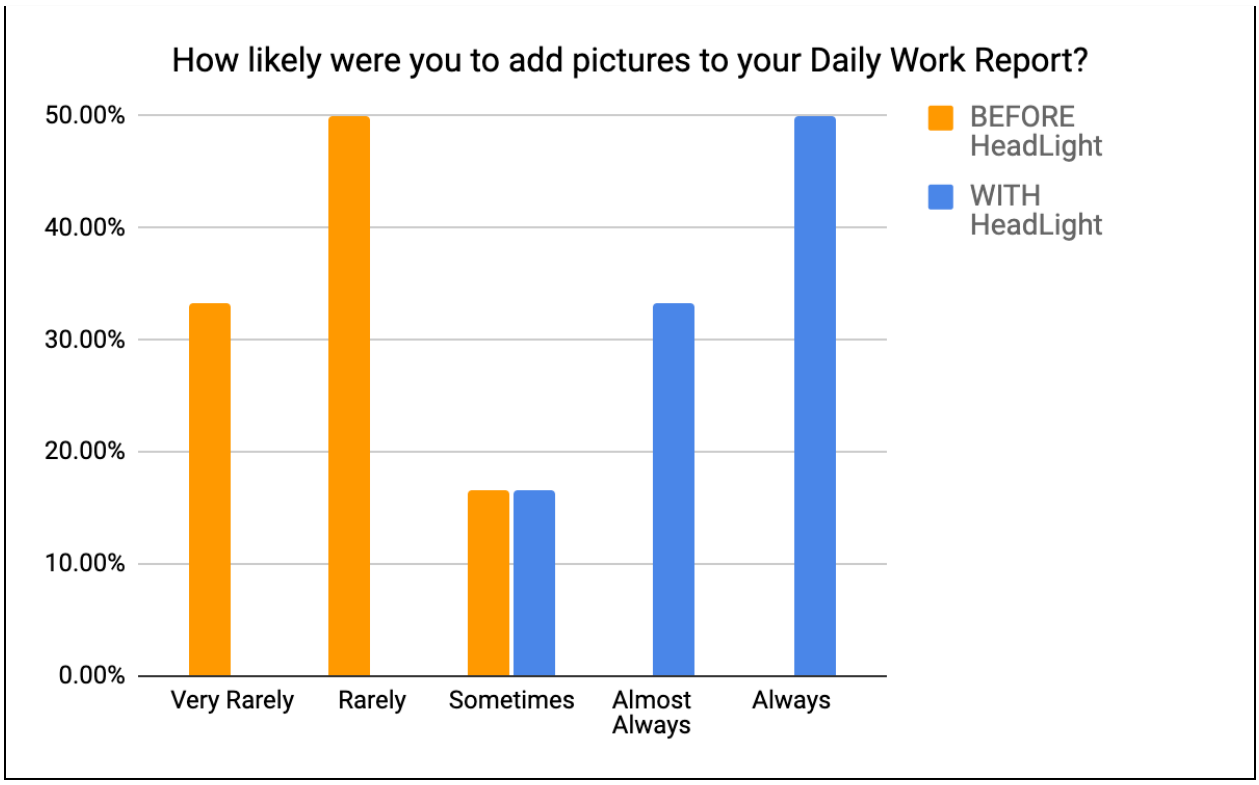
"The number of images attached has improved. We rarely took pictures beforehand. About the only time we ever took a picture beforehand is if we had to send it to our project manager, to have him approve something, a design change or something like that.**"**

- **Jonathan Alexander, Inspector**

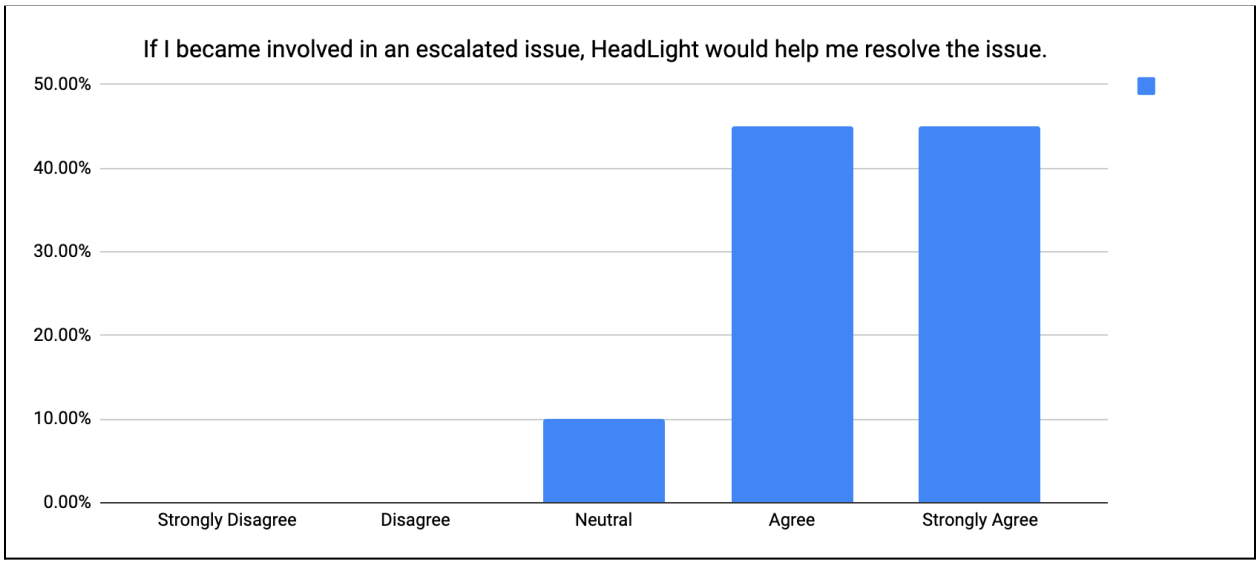
"The way HL works with contractors having access, I think that they could look at pay items and dispute any quantities before an estimate is generated, which would be beneficial.**"**

- **Jamie Malstrom, Construction Engineer**

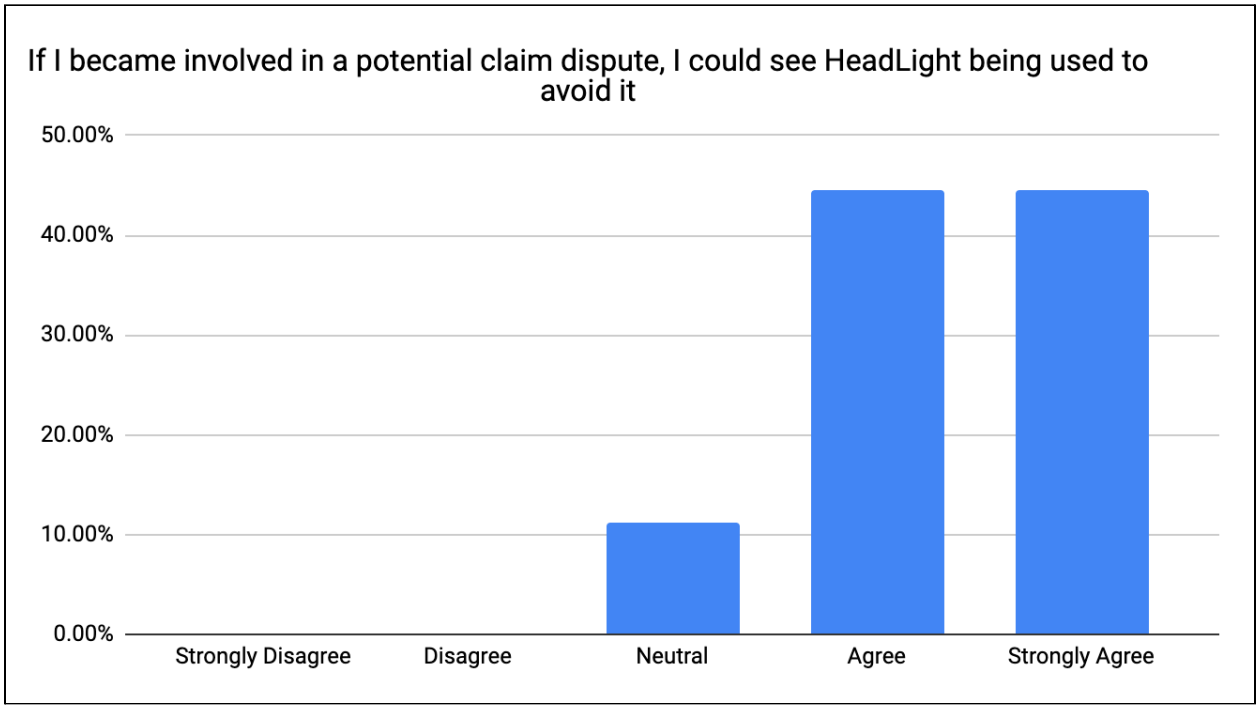
Survey Results



Result: Users did not attach images to a daily report using the traditional method compared to more than 83% of users almost always/always attaching an image to daily report using HeadLight.



Result: 90% of users strongly agree or agree that if they were to become involved in an escalated issue.



Result: 90% of users strongly agree or agree if they became involved in a potential claim dispute, they could see HeadLight being used to avoid it.

Team Performance and Efficiency

- 74% of Pilot participants found it easier sharing information with their teammates using HeadLight vs. using the traditional process.
- On average, users spent 27 minutes at the end of the day entering inspection data on their computer using HeadLight compared to 29 minutes with the traditional process. This was expected during the pilot given an integration was not scoped/active.
- 90% of users strongly agreed or agreed that it was beneficial for new users to have access to a Training Project where they could experiment worry-free once their HeadLight account was created.
- 70% of users found it very easy or easy to locate/access notes, images and/or videos (created by you or another coworker) related to a specific project activity or issue with Headlight versus 10% easy with the traditional process.
- All users agreed/strongly agreed that the quantity of data collected had improved and all users felt HeadLight at least maintained the traditional quality of data with 63% saying it had improved the traditional quality.

Report Comparison and Data Volume (Overall)

Sample daily reports made using the traditional ODOT method were compared with sample reports using HeadLight. A representative sample of 40 daily reports were selected from each method where by the traditional method reports were from the same inspectors on a previous project and the HeadLight method was captured from the pilot data. Examples of each report output can be found in Appendix B and Appendix C. The results are seen in the table below.

Content Type	Traditional ODOT DWR	HeadLight DWR
Equipment data captured?	Yes	Yes
Personnel data captured?	Yes	Yes
Pay Item Quantities and Locations captured?	Yes	Yes
Weather	Yes	Yes
Remarks (word count)	35.4	60.2
Images/Videos (on average per report)	0*	3.1
Geospatial Data (GPS coordinates with each data element collected)	No (none)	Yes (all)
Timestamps (Automated per data element collected)	Remarks only (at time of data entry)	All data (at time of observation)
Labels (per data element collected)	Remarks only (predefined)	Yes (for all observations)

* Images or videos are not included in reports from ODOT.

The following table summarizes the improvement in performance and efficiency noted from the data above.

Data area	ODOT Traditional DWR	HeadLight DWR	Improvement with HeadLight
Remarks (word count per DWR)	35.4	60.2	1.69 x's
Images/Videos (total captured)	0	1,285	1,285 x's more data
Geospatial Data	n/a	Yes	100%
Timestamps	n/a	Yes	100%

Report Comparison and Data Volume (by Project)

The following table illustrates the breakout of the sample data examined between a traditional ODOT DWR and a HeadLight DWR generated in the field. The data is shown per project and compares data that ultimately ended up in a traditional DWR on average when compared to the data that was captured in the field and input automatically into a HeadLight DWR.

Project	Traditional ODOT DWR	HeadLight DWR	Additional Remarks with HeadLight (%)
NHPPI-209N-(078)PM	44	67	152%
STP-241C(059)PM	9	25	278%
STP-214B(068)AG/STP-214B	19	26	137%
STP-243C(032)PM	66	108	164%
NHPP-019N(175)PM	39	75	192%

Related User Comments

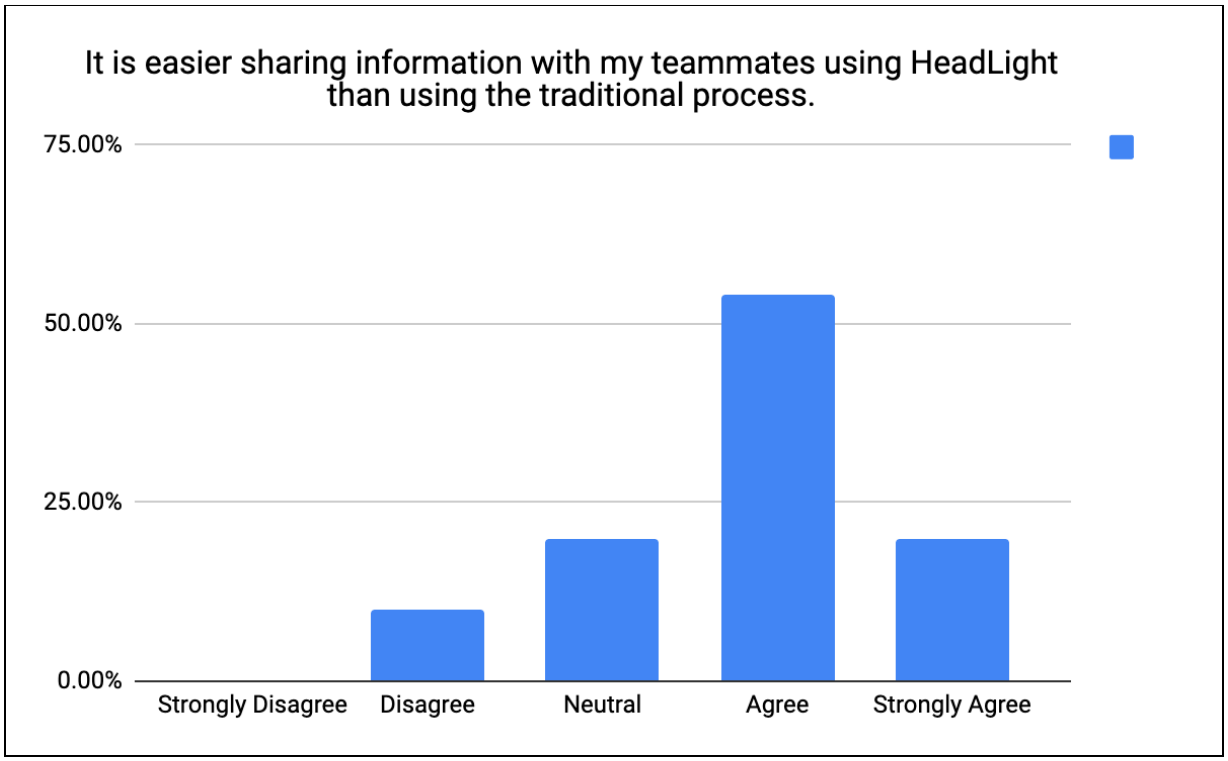
"I like being able to have timestamps and location stamps on reports in HeadLight. You can research and quickly find what you're looking for.**"**

- **Ryan Sullivan, Project Manager**

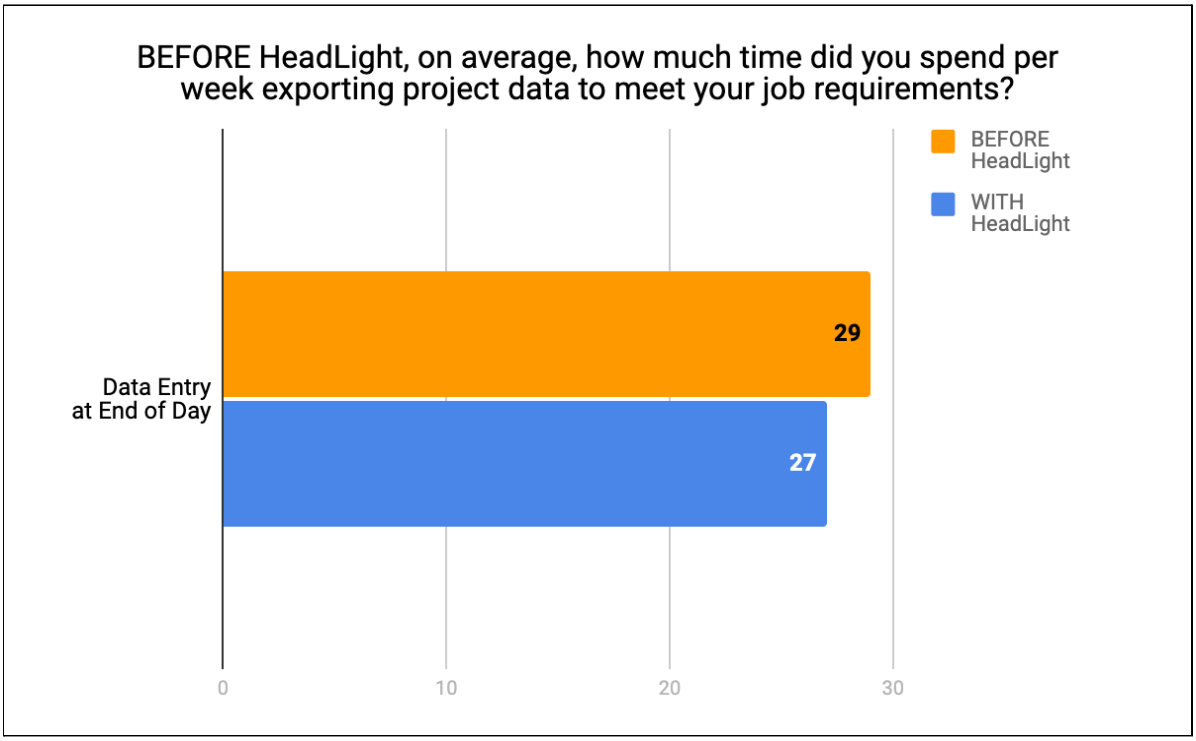
"The easier it is to enter information, the more information we're going to get, which makes better reports, which just improves the communication process and everything overall.**"**

- **Uriah Nichols, Resident Engineer**

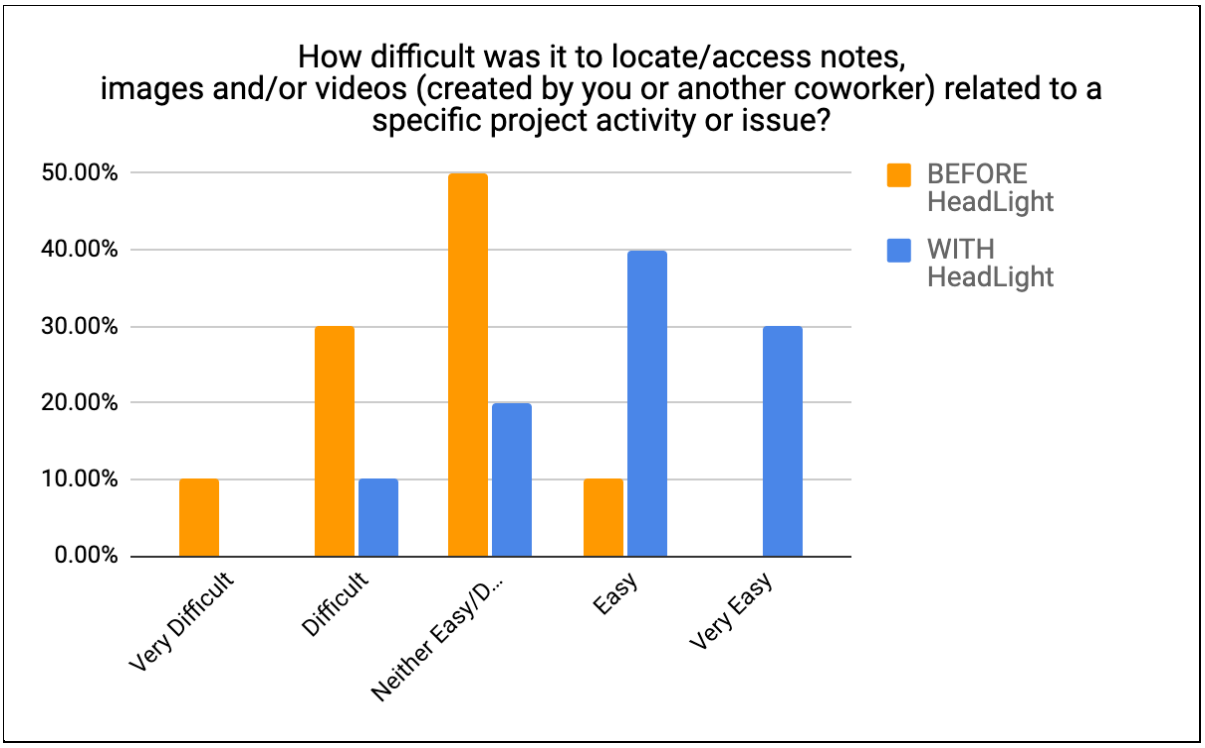
Survey Results



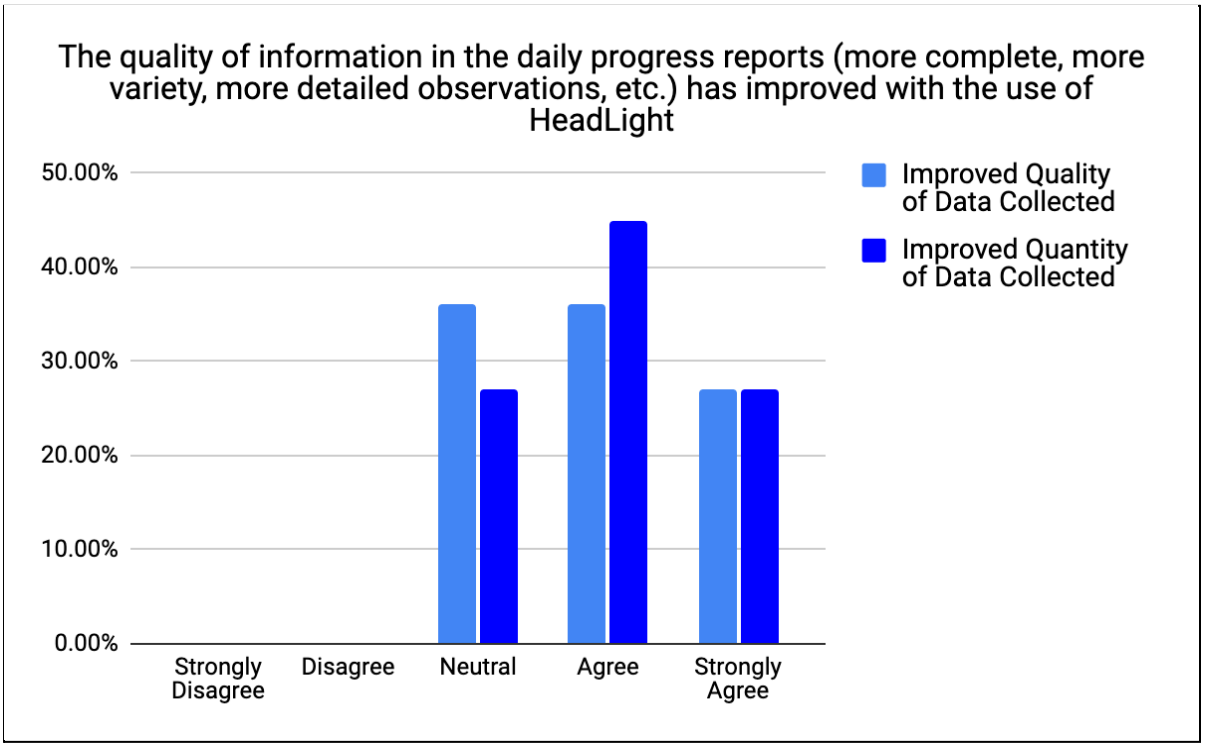
Result: 74% of Pilot participants found it easier sharing information with their teammates using HeadLight vs. using the traditional process.



Result: On average, users spent 27 minutes at the end of the day entering inspection data on their computer using HeadLight compared to 29 minutes with the traditional process.



Result: 70% of users found it very easy or easy to locate/access notes, images and/or videos, created by themselves or another coworker, related to a specific project activity or issue with Headlight versus 10% easy with the traditional process.



Result: The chart above shows all Users agree/strongly agree that the quantity of data collected has improved and all Users felt HeadLight at least maintained the traditional quality of data with 63% saying it improved the traditional quality.

Talent

- 81% of users strongly agreed or agreed that they quickly became comfortable using HeadLight versus 27% with the traditional process.
- 90% of users strongly agree or agree that it is beneficial to have access to a Training Project where they can experiment worry-free once their HeadLight account is created.
- 60% of users reported having to visit job sites very often or often with the traditional process vs 30% with Headlight.
- 92% of users agreed that the consistency of data captured and report completeness has been maintained or improved with Headlight.

Related User Comments

“Definitely nice having that practice project where you can't mess anything up. You can play around with it and go through the Academy and figure out the difference. Having the information where you can train yourself or go back and learn something. We don't have that capability, that I'm aware of with the traditional process. **”**

- Chris Fuhrmann, Resident Engineer

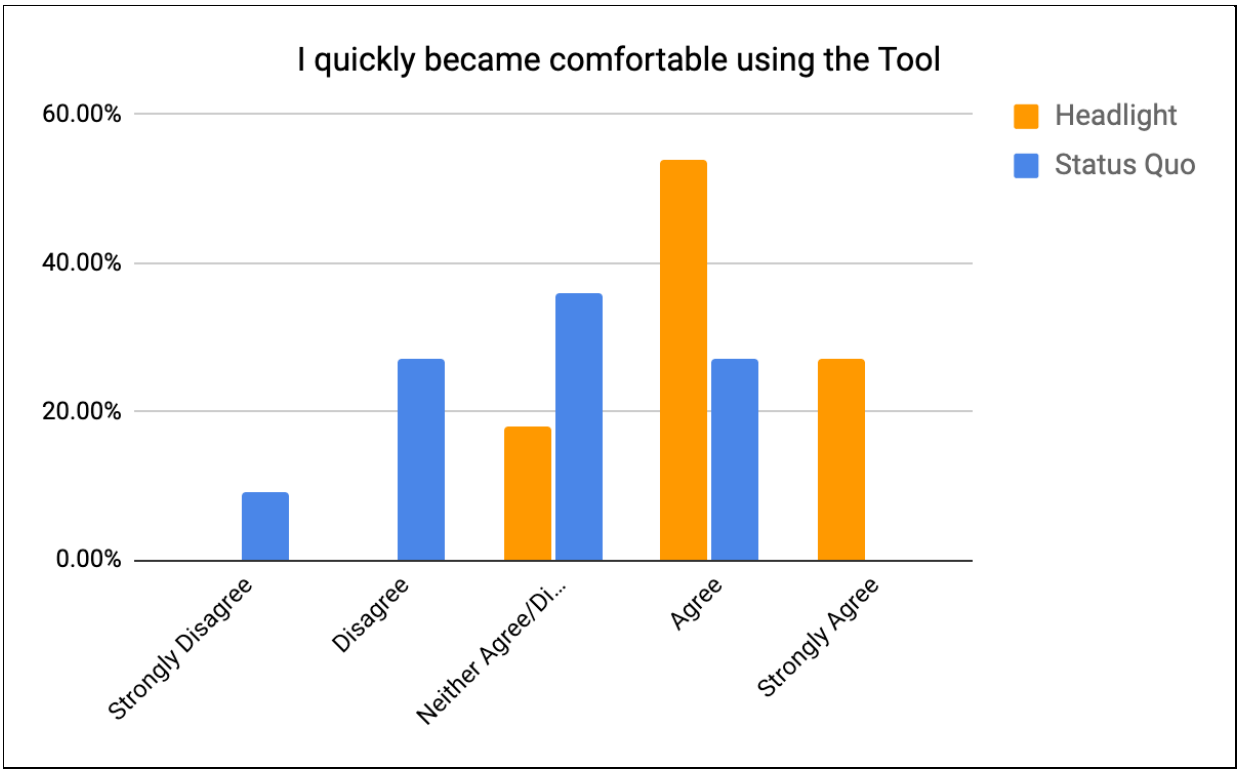
“I can go back into a report weeks later and add something to a report very easily. I liked the option of the reports that it gives you. **”**

- Ryan Sullivan, Project Manager

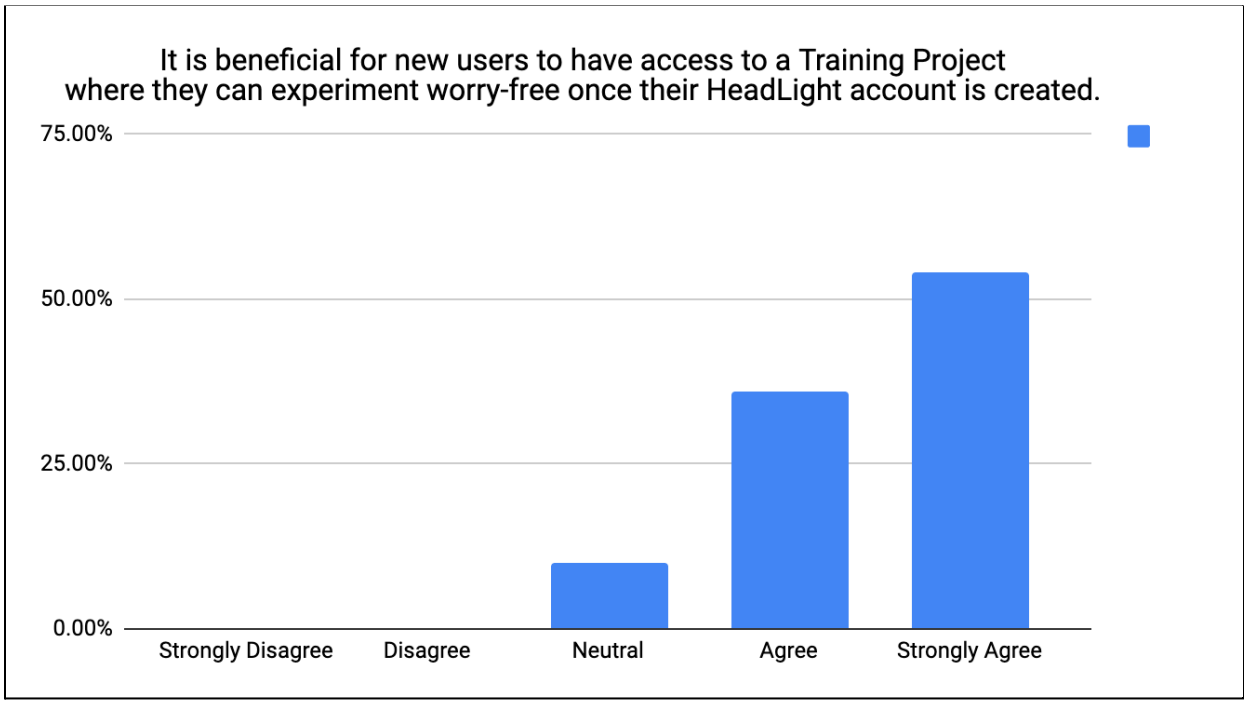
“We started at eight o'clock on a Friday morning. By noon it was like, this is easy.**”**

- **Shawn Riblet, Inspector**

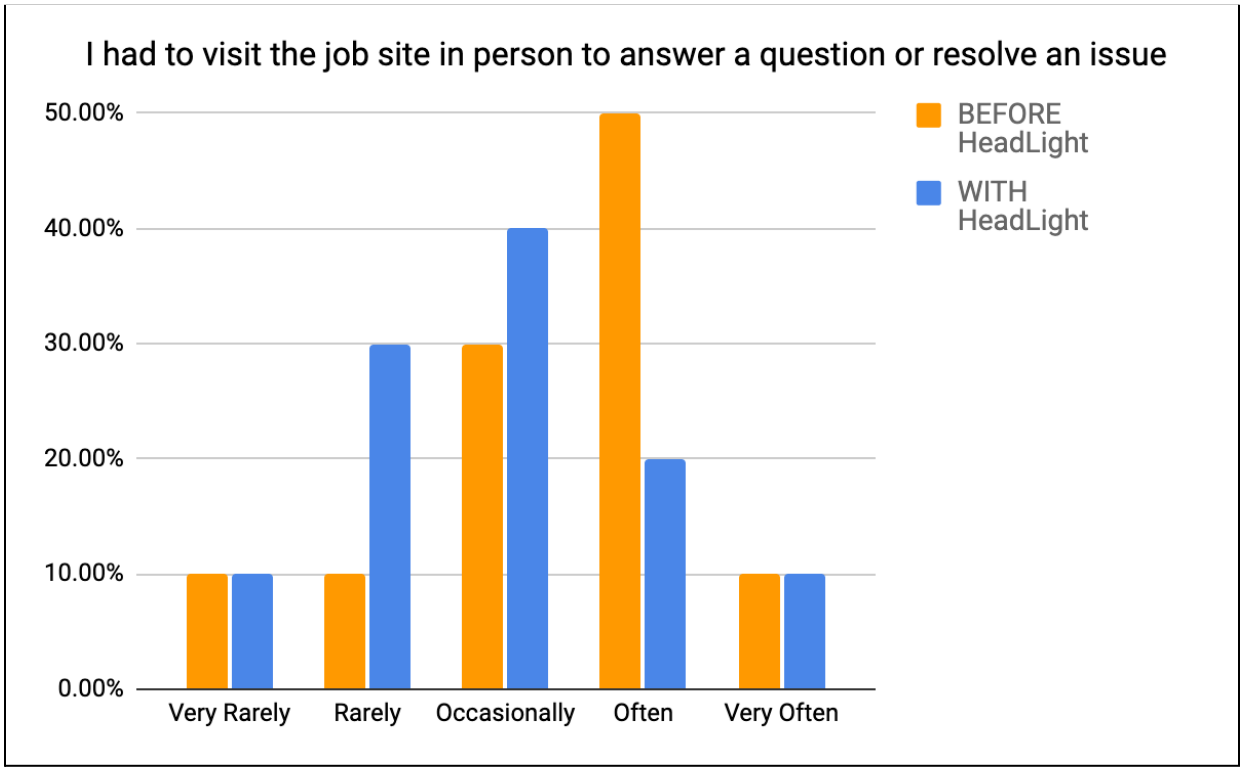
Survey Results



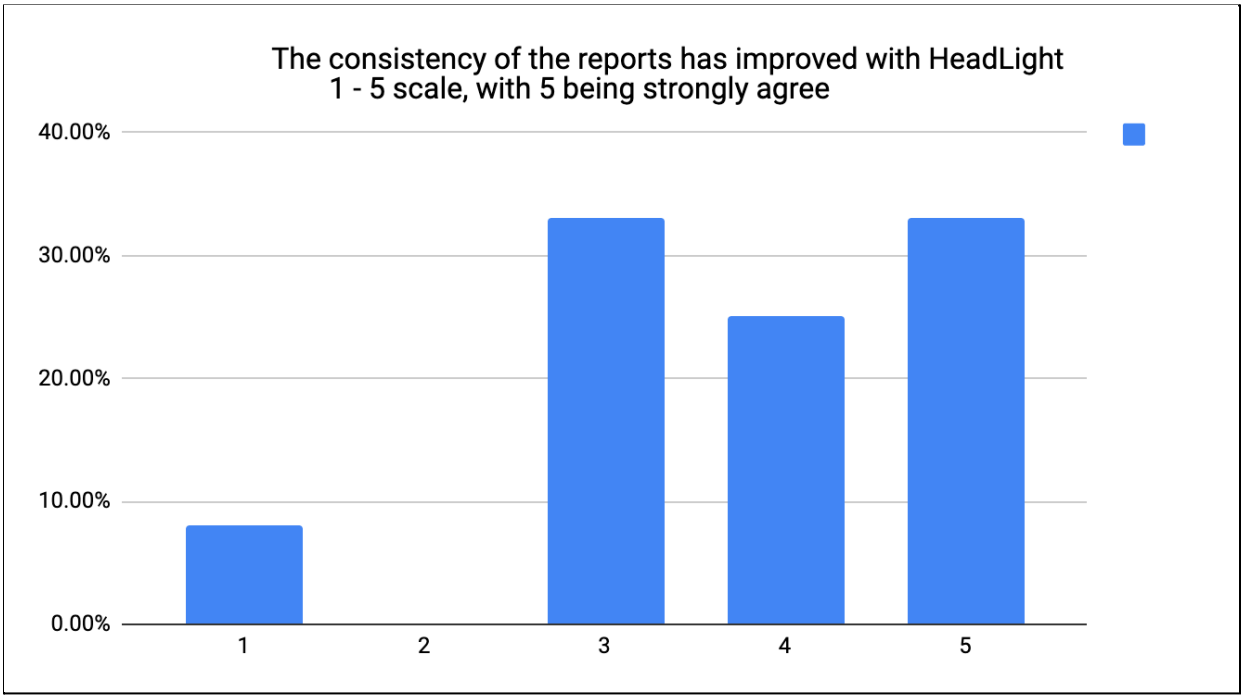
Result: 81% of users strongly agree or agree that they quickly became comfortable using HeadLight versus 27% with the traditional process.



Result: 90% of users strongly agree or agree that it is beneficial for new users to have access to a Training Project where they can experiment worry-free once their HeadLight account is created.



Result: 60% of users reported having to visit job sites very often or often with the traditional process vs 30% with Headlight.



Result: 92% of users agree that the consistency of data captured and report completeness has been maintained or improved with Headlight.

Future Flexibility

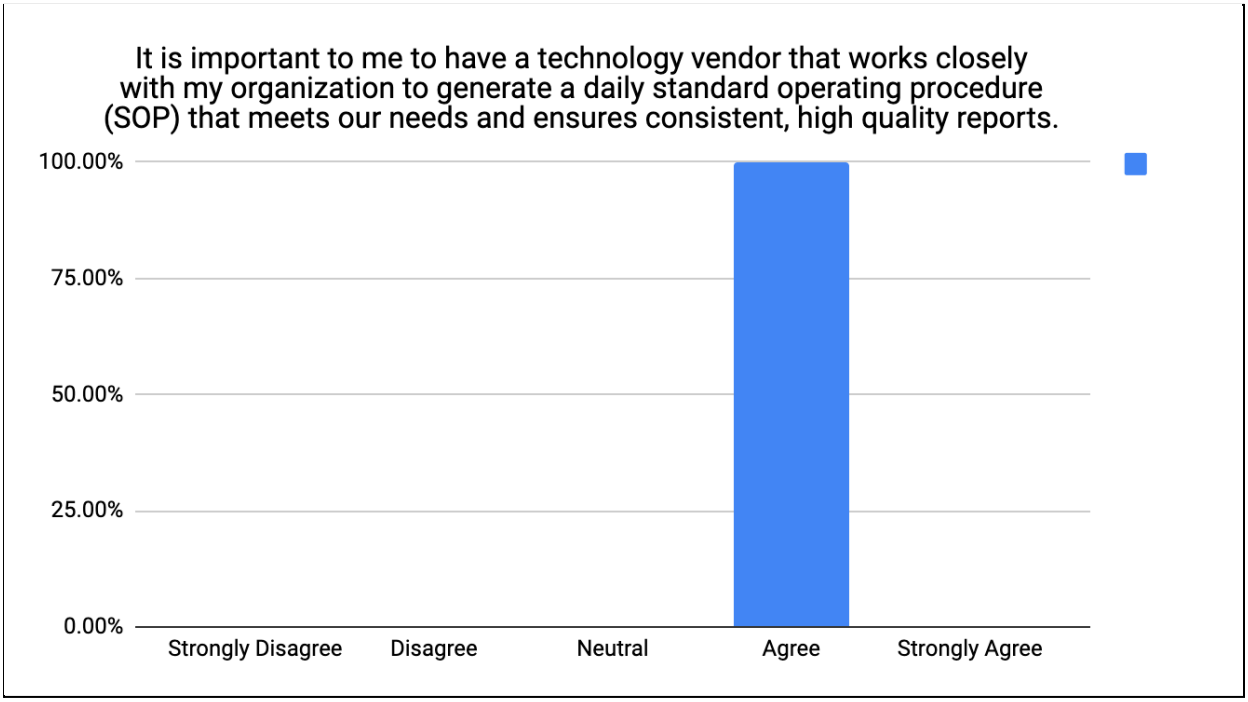
- 100% of Office users agreed that it is important to have a technology vendor that works closely with their organization to generate a daily standard operating procedure (SOP) that meets their needs and ensures consistent, high quality reports.

Related User Comments

"HeadLight gives us an easy view of what's going on and everybody has access to it. I've heard that people outside the office lack the ability to see what's going on. With HeadLight, you've got everything, you've got pictures, videos, notes, whatever you need. So perfect. It's definitely well, well beyond what we've been doing."

- **Ryan Sullivan, Project Manager**

Survey Results



Result: 100% of Office users agree that it is important to have a technology vendor that works closely with their organization to generate a daily standard operating procedure (SOP) that meets their needs and ensures consistent, high quality reports.

Safety

- All users felt that HeadLight at least met the current standard of safety documentation and 67% agreed or strongly agreed that it would allow the Department to capture more than the traditional process.

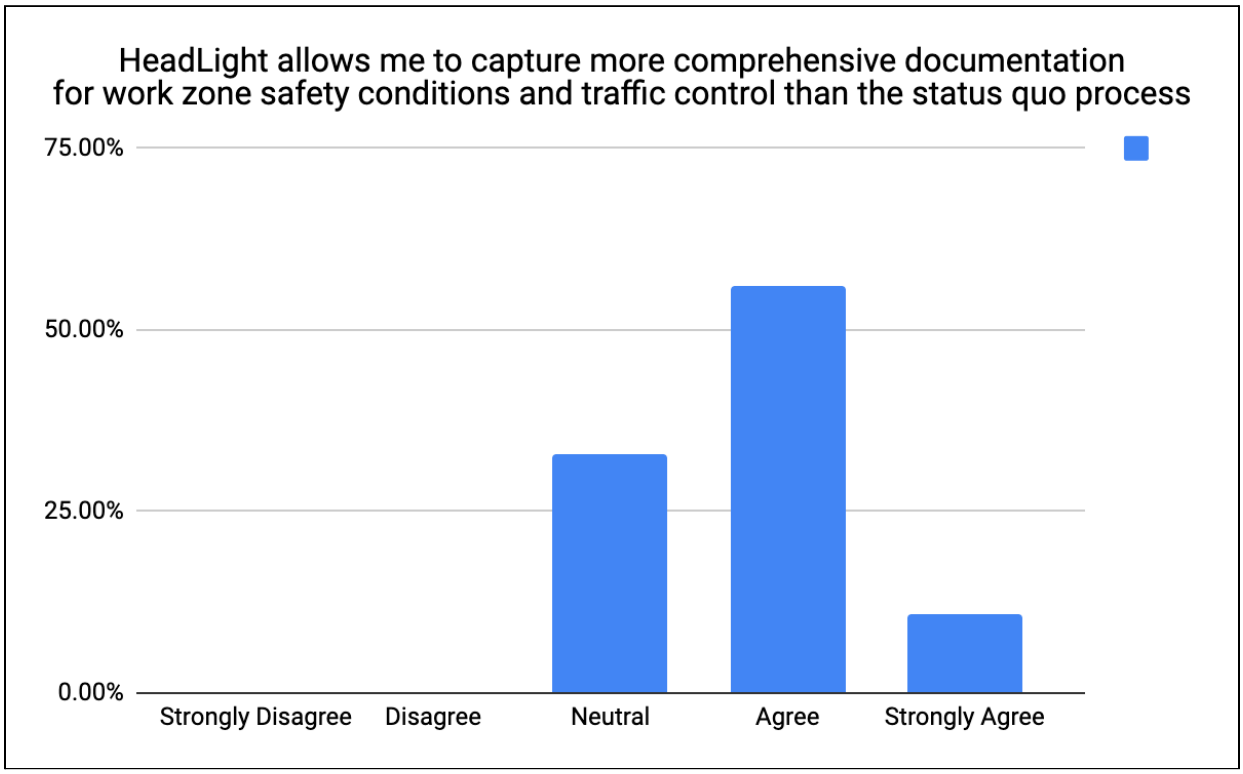
Related User Comments

Does HeadLight allow you to capture more comprehensive documentation for work zone safety conditions and traffic control than the traditional process?

"A hundred thousand percent."

- **Shawn Riblet, Inspector**

Survey Results



Result: All users felt that HeadLight at least met the current standard of safety documentation and 67% agreed or strongly agreed that it would allow the Department to capture more than the traditional process.

Findings

This effort evaluated the impact of using HeadLight as compared to the traditional inspection process used at the Department. Correlating the findings of this effort to the objectives identified by ODOT, and outlined in the background section of the report, the results identified warrant the following conclusions:

1. **ODOT increased the transparency and visibility of inspection data with HeadLight**
    a. Office users reported an increase of 85% in access to completed reports the same day using HeadLight as compared to using the traditional method and found it easy to search for documentation and images for a specific issue. Almost all users agreed that time-stamped, digital records help with communication both in the field and in the office.

2. **ODOT improved the clarity and objectiveness of data available to stakeholders with HeadLight**
    a. The inclusion of images and video with Daily reports compared to no images or video included with the traditional process provided ODOT objective data to the existing process. Many users also felt that searchable online records with attached images and video would help them with any escalations or claims, both within the Department and with outside vendors in regards to safety, quality and billing issues.

3. **ODOT team performance improved with HeadLight by providing productivity increases for office users and increased data capture for field users.**
    a. ODOT saw a significant improvement in data captured and inspector performance. This included capturing over 1,265 more visual data elements, images and videos, compared to the traditional method and 1.69x's the amount of descriptive words used.
    b. ODOT saw a 50% decrease in the number of job site visits users made in order to answer a question or resolve an issue with HeadLight because information is available in real-time once it's uploaded.
    c. ODOT saw improved individual performance of almost 2x (192%) in terms of the quantity of remarks collected and submitted by inspectors directly from the field using HeadLight as compared to what was input using the traditional method and process.
    d. ODOT did not see a large increase in productivity or efficiency for field users in submitting Daily Reports using Headlight, with only a marginal time saving per user per day. This was due to having to enter the information both in the Traditional and HeadLight tools during the pilot. Users in the pilot found HeadLight easy to use, easy to share information with teammates and easy to search for information they needed as compared to the traditional method.

4. **ODOT's users were able to be proficient with HeadLight significantly faster as compared to their existing tools and processes. Given turnover challenges identified, getting new team members up to speed quickly with tools will be important. Additionally, the visual content within the tool itself can help with training and collaboration with new team members**
    a. 81% of users strongly agreed or agreed that they quickly became comfortable using HeadLight versus 27% with the traditional process.

5. **HeadLight provides ODOT a data first platform that enables the Department to not be locked into any specific technology moving forward.**
    a. 100% of Office users agreed that it is important to have a technology vendor that works closely with their organization to generate a daily standard operating procedure (SOP) that meets their needs and ensures consistent, high quality reports.

6. **ODOT can improve their current level of documentation of work zone safety and traffic control using HeadLight to provide a more comprehensive view for the Department.**
    a. All users felt that HeadLight at least met the current standard of safety documentation and 67% agreed or strongly agreed that it would allow the Department to capture more than the traditional process.

Additional Impact Areas Observed

During discussions with the project teams numerous additional use cases have been identified where HeadLight could deliver additional value to ODOT through expanded use. Examples include:

- Expanding use of HeadLight to capture and document density directly in the field
- Expanding use of HeadLight to automate the process for creating bi-weekly reports for management
- Expanding use of HeadLight to further document materials compliance
- Automating integration with SiteManager to eliminate transfer of data manually
- All users felt that HeadLight at least met the current standard of safety documentation and 67% agreed or strongly agreed that it would allow the Department to capture more than the traditional process.

Recommendations

Based on the findings, it is recommended that the Department consider the following activities:

- **Consider Expanding use of HeadLight across the Department.** The impact that HeadLight has shown for improving key objective areas for ODOT suggests that widespread deployment of HeadLight will drive the outcomes the department desires long term. In partnership with ODOT, HeadLight could be deployed statewide 9 months after a green light.

- **Integrate HeadLight data with Internal Systems.** HeadLight can be seamlessly integrated with existing Department systems such as SiteManager. An integration would remove the manual transfer of data experienced during pilot activities and will provide additional time savings for inspectors by eliminating or significantly reducing the 27 minutes per inspector per day spent transferring data. Additionally, an integration would improve data consistency as new projects created in SiteManager would automatically populate HeadLight and vice versa.
- **Establish best practices for HeadLight.** This includes implementing the process where inspectors capture consistent visual data as well as pay item data in HeadLight daily, and share and collaborate in real time with their industry partners through a secure Portal. This will allow the agency and contractors across the state to have a common expectation for documentation no matter where the project is located.
- **Identify additional potential use cases for HeadLight within the Department.** The impact of HeadLight to other job functions within the Department can be considered including: materials, maintenance, emergency management, and construction audit.