



PENNDOT EFFICIENCIES REPORT

Prepared by PennDOT Bureau of Innovations
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Introduction

Due primarily to its important geographic location, decreasing revenues and a vast, state-maintained road and bridge network, PennDOT is faced with one of the toughest challenges of any state Department of Transportation. As the Keystone State, Pennsylvania sees billions of dollars' worth of goods and services travel daily along its 40,000 miles of state-maintained roads and 25,000 bridges. To manage this enormous task, PennDOT relies heavily on developing and implementing innovative and smart approaches to help do its job more efficiently and cost-effectively.

As a major transportation hub, Pennsylvania's roads and bridges serve as the shipping link between the Northeast and the rest of the nation and carry heavy truck loads that add to maintenance issues. From a climate standpoint, Pennsylvania endures more freeze-thaw cycles during winter than most other states, a harsh reality that shortens pavement life.

PennDOT constantly strives to do more with less, work smarter and more efficiently. The Department encourages all of its program areas to review and build process and other improvements to reduce costs. PennDOT developed and maintains a grassroots employee engagement system known as IdeaLink, which since its inception in 2011 has generated more than 3,000 employee suggestions to deliver better services. A companion to IdeaLink, PennDOT's WorkSmart system, serves as a clearinghouse for sharing innovations across PennDOT's statewide operations.

PennDOT has a long history of continuous quality improvement that is rooted in fostering employee ideas and suggestions to help deliver a better product to the tens of millions of customers who use the Commonwealth's vast road network each day. PennDOT partners with the Federal Highway Administration (FHWA), the Pennsylvania Turnpike Commission as well as transportation industry and local government stakeholders to advance proven innovations through the State Transportation Innovation Council (STIC), which has repeatedly been recognized as a national model. The STIC has championed longer lasting pavements, more efficient bridge designs, and safety improvements that protect lives and reduce costs.

In 2018, PennDOT adopted new process improvement tools under Governor Wolf's LeanPA initiative. Standing up a Lean community of practice across the Department's eleven engineering districts, PennDOT Lean Leaders assist teams in identifying and deploying problem-solving approaches to ensure we are continuously pursuing the safest, easiest, and most efficient ways of doing business. Further, innovations councils, committees and competitions across the Department provide employees at all levels with opportunities to suggest and participate in implementing improvements in their work areas.

Since 2015, PennDOT process improvement and cost savings initiatives, along with changes implemented as a result of employee suggestions, have resulted in an estimated annual savings of \$48 million, with similar initiatives always underway.

PennDOT Business Activity	Estimated Annual Savings Since 2015
County/District Maintenance Operations <i>(includes county-level roadway and bridge maintenance and winter operations)</i>	\$41.5 million
Project Delivery <i>(includes roadway and structure design and construction activities)</i>	\$5 million
Multimodal Transportation <i>(includes support and oversight for public transit, aviation, rail, ports and waterways)</i>	\$1.5 million
Total Estimated Cost Savings and Avoidance	\$48 million

Cost-saving efforts are displayed throughout this report. This report also contains many initiatives still in progress that will produce efficiencies either for PennDOT, its partners or the public.

To help ensure the Department is prepared for challenges and meeting customer expectations, each year, the PennDOT Secretary and the Executive Committee engage in an extensive strategic plan update that aggressively challenges organizational thinking and resets objectives. During this update, PennDOT leadership sets goals, anticipates potential hurdles, and develops forward-thinking strategies to deliver the best possible customer service.

Another effort PennDOT supports is the Commonwealth of Pennsylvania’s cooperative purchasing program, COSTARS. Through COSTARS, local governments can save dollars by purchasing through state contracts.

PennDOT does its very best to keep Pennsylvania moving forward to a more prosperous future and to wisely spend taxpayers hard-earned dollars invested with the agency. Meeting that goal is ever more challenging as technological advances change the transportation revenue dynamics, but PennDOT is working hard to ensure that each taxpayer resource is invested wisely.

Design and Construction Efficiencies

Automated PennDOT Data Integration Facility (PDIF) Cost Exposure Log

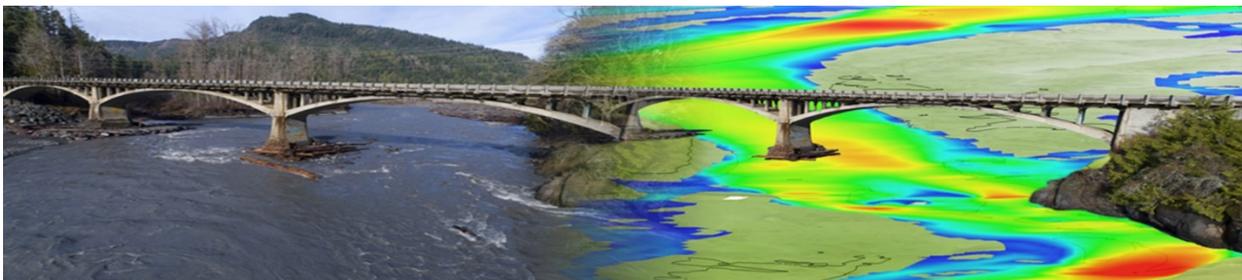
What is it? PennDOT Districts 2 and 4 collaborated to address manual cost sheet creation methods by using already available technology.

How is it more efficient? By using existing technology, the Department was able to avoid cumbersome, error-prone, and time-consuming manual data input by automating reports for field personnel. This helps **eliminate human error** and **provides real-time, accurate project information** for future work order forecasting in seconds.

Collaborative Hydraulics: Advancing to the Next Generation of Engineering

What is it? Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE) encourages the use of two-dimensional (2D) hydraulic modeling, which refers to a variety of software programs that provide graphical interfaces and supporting resources that can be applied to infrastructure design. 2D modeling tools allow for more reliable hydraulic design and more effective collaboration and communication with project partners and stakeholders.

How is it more efficient? This innovation provides better tools for visualizing interactions between waterways, the transportation network, and the environment, and allows for a more streamlined project development approach. It can significantly improve the ability to design **safer, more cost-effective, and resilient** structures on waterways.



Construction Unit Digital Plans and Filing

What it is? As a result of teleworking, PennDOT District 10's Construction Unit converted to a 100 percent paperless process for plans and digital filing via Microsoft OneDrive.

How is it more efficient? Using digital methods for plans in construction, converting to paperless correspondence, and implementing digital filing has made work more efficient and **reduced costs** related to utilities usage, supplies purchases, overtime, and travel.

Cost Control Policy Checklist

What is it? A Cost Control Policy checklist was created in PennDOT's District 4 for construction field personnel to provide them with guidance and standardized check points for when supervisors and managers need to be notified of potential cost increases.

How is it more efficient? The policy and checklist enable managers to evaluate and determine the best course of action before the work is completed. This **saves time** and **supports projects being completed on time and on budget**. Work authorization costs, including projected costs, are captured on the cost sheet and assessed monthly. This policy further reduces the instances when base repair work or final milling and paving are eliminated on projects with large overruns.

Design-Build Traffic Control Plans



What is it? Design-Build Traffic Control Plans (DBTCPs) improve project delivery by exploring ways to provide greater contractor flexibility in constructing the project.

How is it more efficient? DBTCPs offer **greater flexibility, improved efficiency, and better schedule control** during the design and build phases of a project by allowing the contractor and design consultant to work closely on the final design of the

traffic control plan and providing flexibility in selecting materials, construction methods, and available resources.

e-Construction and Partnering

What is it? e-Construction and Partnering (eCP) uses web-based and mobile platforms to reduce or eliminate the use of paper and increase collaboration and communication on construction projects. PennDOT employees, along with contractor and consultant personnel, use iPads to access several e-Construction apps to share information and connect to PennDOT's core systems.

How is it more efficient? Utilizing e-Construction **increases the level of automation** on construction activities and helps to **reduce costs** through the reduction of paper, and elimination of printing and storage needs. It **increases transparency** through secured and expedited document transmissions, and saves time through online communication, which helps to eliminate misunderstandings and expedites project delivery schedules. e-CP **increases efficiency** as inspectors, on average, are spending one and a half fewer hours each day on administrative tasks, enabling them to spend more time in the field engaged in valuable inspection and quality assurance duties.



Estimating Committee for Engineer Estimates

What is it? This District 3 committee brings together team members representing different levels and areas of experience and expertise to develop and compare project estimates.

How is it more efficient? Cumulative performance over the last seven years shows estimating within 10 percent of the contractor's low bid has **improved by 12 percent**. Cost estimates closer to the actual bid price result in **more accurate** values of available funds to be programmed for projects.

Epoxy Overlay for Half-Width Placed Concrete Deck Structures

What is it? By using an epoxy surface treatment on concrete deck structure, PennDOT's District 2 is able to limit the damage done by the use of salt for winter maintenance.

How is it more efficient? Extending the life span of a bridge deck will ultimate **lower maintenance costs** and enable bridge replacement to be spread out over a greater number of years.

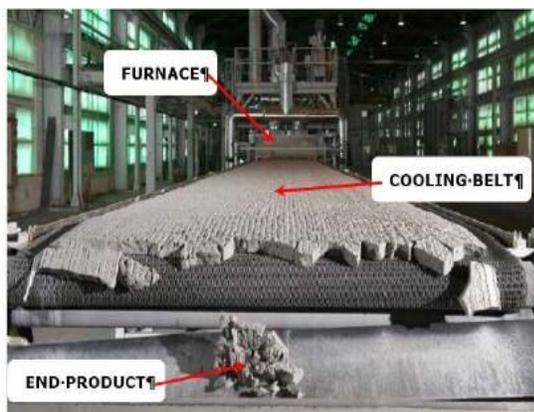
Expanded Polystyrene Geofoam

What is it? Expanded Polystyrene Geofoam (EPG) is a rapid embankment construction technique used in Accelerated Bridge Construction that involves the use of a lightweight, rigid foam plastic in place of traditional embankment or backfill materials.

How is it more efficient? EPG accelerates foundation construction, which **reduces project timelines, saves money, and requires limited labor** for construction. It exerts little to no lateral load on retaining structures and can be constructed easily in limited right-of-way areas and in adverse weather conditions.



Foamed Glass Aggregate



What is it? Foamed Glass Aggregate (FGA) consists of finely ground waste glass cullet and waste silica-car-bide powder fused together, triggering a chemical reaction that releases carbon dioxide and produces a closed cell foamed glass product. FGA helps to mitigate problems on vertical and lateral loads, such as reducing potential settlement/consolidation of underlying soft soils, taking pressure off old water/sewer pipes, and reducing loads on distressed retaining walls. It can also be used as an alternative backfill material.

How is it more efficient? The Department's initial interests are with using FGA as a lightweight fill material, which promotes competition and **reduces unit**

costs while using normally useless waste materials. FGA **uses recycled materials** that would otherwise end up in a landfill.

Geosynthetic Reinforced Soil-Integrated Bridge Systems



What is it? Geosynthetic Reinforced Soil-Integrated Bridge Systems (GRS-IBS) is an Accelerated Bridge Construction method which uses alternating layers of geotextile material combined with crushed and graded stone and concrete facing blocks to construct the bridge abutments. The IBS is created when the superstructure (typically beams and deck) is placed on top of the GRS abutments to create the bridge.

How is it more efficient? GRS-IBS bridges are easy to build and maintain using local equipment and workforce personnel, **reducing costs by up to 60 percent**. The easily modified design **can be adapted** to a variety of field

conditions and bridges **can be built in a matter of weeks**. It can help state and local agencies meet the demand for small, single-span bridges by delivering low-cost, durable, and low-maintenance structures in less construction time, which means **less exposure around work zones** and thus improving safety.

Highway Safety Improvements

What is it? PennDOT District 3 leveraged federal dollars administered through the Department's Highway Safety Improvement Program (HSIP) to create safer conditions for motorists by more efficiently completing safety improvement projects such as rumble strips, all-weather pavement markings, high friction surface treatments, and high tension medium cable barriers.

How is it more efficient? Through these efforts, District 3 realized a **30 percent Fatalities and Suspected Serious Injuries (F+SSI) avoidance** compared to the statewide average of 11 percent. These efficiencies were gained by including systemic infrastructure projects into programmed freeway projects, and programming separate contracts to fill in the gaps.

Landslide Repairs Using Sheet Piles



What is it? Sheet piles are sections of sheet materials with interlocking edges that are driven into the ground to provide earth retention and excavation support. Sheet piles is an innovative landslide repair technique used to help stabilize slopes.

How is it more efficient? Using this technique allows the Department to quickly install and eliminate roadway restrictions that otherwise may not have been addressed for years, allows roadways to be reopened more quickly, and in many cases results in significant cost savings. For example, the repair of a slide on Harrison Hollow Road in Lincoln Borough, Allegheny County in PennDOT's District 11 was completed using sheet piles for approximately 25 percent of the originally estimated cost.

Robotic Roadway Marking System

What is it? Manually laying out traffic markings can be dangerous for roadworkers. By automating this process, PennDOT District 6 found some major improvements, mainly in saving time and lives.

How is it more efficient? Using a truck to perform traffic marking layout work **improves worker safety, reduces traffic impacts, limits mistakes, and expedites the process**, resulting in a **75 percent reduction** in labor costs.

Roller-Compacted Concrete

What is it? Roller-Compacted Concrete (RCC) was used in District 12 to construct a Pennsylvania State Police commercial vehicle truck inspection area and an over-steepened slope between phases of a roadway reconstruction project that would have been difficult to construct with typical beams and lagging, due to the existing overhead utilities.

How is it more efficient? RCC allows for the **safe construction** of these features with a **durable** product and a **cost-effective** technique.



Self-Propelled Modular Transporters



What is it? Self-Propelled Modular Transporters (SPMTs) are motorized vehicles that can move fully loaded at walking speed, or 3 mph, and are capable of carrying large structures, such as bridges, from offsite locations, positioning them precisely into final position. The SPMT then exits the site, opening the area to traffic possibly in minutes to within a few hours.

How is it more efficient? PennDOT's District 11 used SPMTs for the first time to place the new Shaler Street Bridge superstructure over State Route 19 in two days. The use of SPMTs on this project resulted in **user cost savings** from the reduction in traffic restrictions during construction and avoided impacts to Heinz Field events.

Slide Inventory and Rating Database

What is it? The Slide Inventory and Rating Database is a spreadsheet that inventories embankment failures within PennDOT's District 12 and prioritizes the failures based on various factors including severity, traffic volumes, impact to roadway and private property, access, geotechnical factors, maintenance factors, and similar.

How is it more efficient? This database has helped the district **focus repairs** on the most critical failures and **provide the best service possible with limited funding**.

Virtual Construction Inspection for Utility and Highway Occupancy Permit Projects



What is it? Several PennDOT districts now allow virtual construction inspections for permit projects.

How is it more efficient? A permit applicant's engineer simply emails PennDOT forms and photos of the completed work. Where used, these projects did not require a single PennDOT construction inspector, **saving the Department staff time**. Additionally, the applicant is not required to have someone conduct full-time inspections.

Virtual Construction Inspection for PennDOT's Municipal Separate Storm Sewer System Program

What is it? PennDOT has or is in the process of bidding five stream restoration projects, the first of which is complete. The vendor flies drones and provides video of the progress. Deliverables are paid by percent complete.

How is it more efficient? For projects that did not require a construction inspector, the Department **saved staff time**.

Virtual Environmental Scoping Field View

What is it? PennDOT District 3 has implemented a virtual process for conducting scoping field views using data from internal systems, other agency GIS systems, photos, video log imagery, Google Street View, and other supportive documentation to perform a thorough virtual review that meets all requirements.

How is it more efficient? By conducting scoping field views virtually, **travel time and costs have been reduced or eliminated**. Further benefits include better attendance at meetings, resulting in fewer follow-ups and more effective scoping field views.

Driver and Vehicle Services Efficiencies

COVID-19 Mitigation Efforts

PennDOT has made modifications to how business is conducted to keep both customers and employees safe, while still providing critical services.

1. Use of Photo on File for Driver's License Renewals

What is it? In an effort to reduce the number of customers visiting driver license and photo license centers, the Department implemented the photo-on-file process in May 2020. Customers who complete a driver's license and/or photo ID card renewal by mail or online have their product automatically sent using their current photo on file.

How is it more efficient? This process has helped to **keep customer and employees safe**, while **reducing the number of face-to-face visits** at driver license and photo license centers. As of March 2021, approximately 1.7 million customers have utilized this service.

2. Modified Non-Commercial Driver's License Skills Testing

What is it? In June 2020, PennDOT developed and deployed modified non-commercial skills testing procedures for use at both PennDOT testing facilities and non-commercial third-party testers.

How is it more efficient? These procedures **enabled testing to resume without sacrificing the integrity of the test, allowed backlogs to be addressed, and helped ensure the safety of customers and staff**. Since June 2020, approximately 200,000 tests have been administered.

3. Virtual Departmental Hearings

What is it? Departmental hearings are a result of point accumulation of a driver's record and have generally been conducted in-person at a driver license center in the past. In September 2020, the Department implemented virtual hearings.

How is it more efficient? The implementation of virtual hearings not only allowed for compliance with COVID-19 mitigation efforts but has created a much smoother scheduling process. Customers call and schedule a time that is convenient for both themselves and the Driver Safety Examiner; this has **created fewer reschedules** and **significantly reduced no-shows**.

4. Virtual Administrative Hearings

What is it? Administrative hearings, requested by a driver to conduct a review of their driving record, are now being held virtually. PennDOT's Bureau of Driver Licensing (BDL) is also in the process of making scheduling of these virtual hearings more efficient. By the end of April 2021, the main hearing office will be scheduling hearings.

How is it more efficient? This streamlines the coordination process and provides the BDL Administrative Docket clerk with a prepared package for the hearing, which **saves hours for the docket clerk** and **reduces or eliminates travel for all parties** involved.

Dealer Agent Services

What is it? PennDOT implemented the Dealer Agent System (DAS), which allows dealers to perform online services, such as renewals and contract updates. The Department also implemented Online Agent Services Training, which allows authorized agents to complete contract required trainings online.

How is it more efficient? The move to online services and trainings results in **reduced travel-associated costs** for PennDOT's contracted business partners.

Emissions and Inspection Station Enhancements

PennDOT implemented several enhancements to support Pennsylvania's inspections stations and improve customer service.

1. Online Inspection Station Application

What is it? PennDOT implemented the online inspection station application, which allows stations to access their information online, make updates as needed, and see the date of orders being processed.

How is it more efficient? This **increases efficiency** with processing station applications, sticker orders, and updating station and inspector records.

2. Inspector Certification Cards

What is it? PennDOT eliminated the mailing of inspector cards by giving inspectors the ability to apply for their initial certification card online.

How is it more efficient? This resulted in **reduced mailing costs**.

3. Online Emissions Certifications

What is it? PennDOT implemented online initial certification and recertification for emission inspectors.

How is it more efficient? This eliminated the needs for these individuals to attend school in person, thereby **eliminating travel-associated costs**.

4. Emissions On-Board Diagnostic Analyzer Equipment Specification Updates

What is it? Equipment specification updates were made to ensure proper emissions testing is completed.

How is it more efficient? This provides **times savings for inspectors** and the ability to connect to broadband for system updates and data processing.

5. Inspection Station Changes

What is it? PennDOT made updates to allow for inspection station changes of authority/station manager to be processed internally by its Station Mechanic Unit.

How is it more efficient? This change eliminates the need for a site visit by a PennDOT Quality Assurance Officer, **saving travel-associated costs** on 200 to 300 site visits per year.

6. GlobalSpace Implementation

What is it? PennDOT implemented the use of GlobalSpace, which allows for documents to be securely sent online to emissions contractors rather than through the mail.

How is it more efficient? This provides for **increased security and efficiency** as well as a **cost savings to customers and savings to PennDOT by avoiding paper documents and mailing costs**.

7. Safety Inspection Audits

What is it? PennDOT deployed mobile devices to its Quality Assurance Officers (QAOs) for the purpose of conducting safety inspection audits.

How is it more efficient? This allows for **increased productivity** and the electronic transfer of audit reports to Central Office for processing. Previously, QAOs spent one day a week in the office processing paperwork; use of the mobile devices eliminates the need for the in-office processing, which allows the auditor to remain in the field five days a week.

8. Virtual Hearings

What is it? Departmental hearings for audit findings at safety and emissions inspection stations have historically been held in person. In January 2021, the Department implemented virtual hearings.

How is it more efficient? The implementation of virtual hearings has not only allowed for compliance with COVID-19 mitigation efforts, but it has **eliminated long drive times** for hearing officers, quality assurance officers, inspectors, station owners, and often law enforcement officers. This has also **saved staff time**, by eliminating the need to drive to hearings across the state. Virtual hearings are also **more convenient** for businesses and law enforcement.

Enhancing the Customer Experience

Since 2015, PennDOT has implemented several driver and vehicle service improvements to enhance the customer experience.

1. Onsite Customer Service Greeters

What is it? PennDOT implemented the use of customer service experience specialists at its driver license centers to maximize customer flow by helping to answer questions and triage paperwork before the customer takes a queuing ticket.

How is it more efficient? This has helped to **improve overall operational efficiency**.

2. Queuing System Updates

What is it? In 2015, PennDOT began installing an updated automated queuing system in all of its high-volume driver license centers. To date, 56 out of 76 driver license centers are equipped with the updated queuing technology.

How is it more efficient? The queuing system allows for **more efficient management** of customer flows, **minimizes wait times**, and supports management of customer expectations.

3. Acceptance of Card Payments

What is it? PennDOT began accepting card payment at all REAL ID centers in March 2019 and all other driver license centers by July 2019.

How is it more efficient? This provides an **additional convenience for customers**; previously, the driver license centers only accepted checks or money orders.

4. Customer Feedback Units

What is it? Expressia Customer Feedback Units (CFUs) have been added to all REAL ID centers for customers to rate their experience in real time. PennDOT is currently analyzing options to implement these units at additional driver license centers.

How is it more efficient? The real-time results are utilized to **quickly make adjustments** and support further **enhancing the customer experience**.

5. Knowledge Testing System Enhancements

What is it? When the system was enhanced at all driver license centers in 2018, translations of all knowledge testing questions were expanded from 10 to 18 languages.

How is it more efficient? This provides for **equitable customer access** and **convenience**.

6. Non-Commercial Driver's License Manual Translation

What is it? PennDOT finalized translations of the non-commercial driver manual in early 2019, which expanded availability from 10 to 18 languages.

How is it more efficient? This allows applicants the opportunity to study in their primary language supporting **equitable customer access** and **convenience**.

7. Online Transactions

What is it? PennDOT has made additional online transactions available to customers, including uploading insurance documents, and placard renewals, reissuance, and changes of address.

How is it more efficient? This has **improved customer access and convenience**.

Full Reciprocity Plan

What is it? The International Registration Plan (IRP), of which PennDOT is a member, implemented the Full Reciprocity Plan (FRP), providing the trucking industry with greater flexibility allowing apportioned registrants access to operate in all IRP jurisdictions.

How is it more efficient? Established apportioned registrants benefit through the elimination of trip permits and "over 100 percent fees" for added jurisdictions as the FRP bases fees on actual distance traveled in the last reporting period.

Non-Commercial Driver's License Testing Program

What is it? PennDOT implemented the Non-Commercial Driver's License (Non-CDL) Third-Party Testing Program in May 2016, which provides customers another service option to take the non-commercial skills test for a market-driven fee. Since implementation, the program has grown to 27 companies providing the non-commercial skills testing at 44 locations statewide.

How is it more efficient? To date, more than 150,000 non-commercial skills tests have been conducted by the non-commercial third-party companies, **saving the Department staff hours**.

REAL ID

On March 1, 2019, PennDOT began issuing REAL ID compliant driver's licenses and photo identification cards, which streamlines the customer's ability to board domestic commercial flights, and enter secure federal, military, and nuclear facilities. To date, more than 1.1 million REAL ID products have been issued through all available channels.

REAL ID Issuance and Renewals

What is it? PennDOT offers customers the below three options to apply for a REAL ID in Pennsylvania.

- a. Customers can **apply for pre-verification** for a REAL ID on PennDOT's website. If all necessary documents are verified to be in PennDOT's database, an email is sent to the customer with a link for online enrollment for REAL ID; this eliminates the need for the customer to visit a driver license center. Approximately 190,000 customers have been pre-verified to date.
- b. Customers can **visit any PennDOT Driver License Center** to have their documents verified and then receive their REAL ID in the mail.
- c. Customers can **visit any REAL ID Center** (currently 13 centers across Pennsylvania) to verify documents and receive their REAL ID at the time of service. These centers are strategically located within the vicinity of large Pennsylvania population centers and airports.

Additionally, the expiration date of the initial REAL ID product includes any time remaining on a customer's current driver's license or photo ID card, plus an additional four years. When it's time to renew their REAL ID, customers can do so online and receive a camera card in the mail. Electronic verifications are performed in real time at the time of service to meet the federal regulations for remote issuance.

How is it more efficient? This has **enhanced the customer experience** by providing options and improved convenience to obtain and renew a REAL ID.

Information Technology Efficiencies

Construction Document System Version 3 (CDSv3)

What is it? CDSv3 is an externally accessible system that allows business partners, PennDOT personnel, construction site personnel, and support staff to electronically submit construction documentation and obtain electronic signature approvals.

How is it more efficient? Instead of completing paper forms and mailing them to recipients, all forms and documentation have validations performed at time of submission, which are stored electronically and passed to recipients in real time. In addition, calculations were provided for submitters to ensure accuracy. This effort **reduced PennDOT's operational costs**.

Electronic Construction Inspection Mobile Application

What is it? With construction inspectors required to maintain daily inspection reports, PennDOT developed a mobile construction application that allows for the real-time data entry of construction inspection results in the field, thereby eliminating tedious and time-consuming paper-based process.

How is it more efficient? Use of the mobile application eliminates the need for inspectors to travel back to the office to input data and brings a higher level of automation to construction activities. Inspectors are spending **one and a half fewer hours each day** on administrative tasks, enabling them to spend more time engaged in valuable inspection and quality assurance duties.

Electronic Materials Filing

What is it? District 11 implemented 100 percent electronic materials filing using an Excel Material Book and the PennDOT Project Collaboration Center (PCC), which enables materials inspectors to perform audits without traveling to field offices. The electronic materials filing will be implemented throughout the Commonwealth in the PennDOT's Engineering and Construction Management System (ECMS).

How is it more efficient? Electronic filing **saves resources and optimizes staff time** by eliminating the need to handle paper copies, allows employees to perform materials audits from home, and has **resulted in travel cost avoidance** as Materials Unit staff no longer need to travel to project field offices to perform their audits.

Electronic Payroll Mobile Application

What is it? The ePayroll Mobile App provides a consistent, automated, and simplified tool for PennDOT foremen to enter, edit, and submit payroll data from a mobile device while working in the field.

How is it more efficient? The new app saves significant time for data entry and creates efficiencies by validating data prior to entering the workflow review and reducing rejection rates. Since the app was implemented, **rejection rates have dropped from 84 percent to 28 percent**. The resulting efficiencies and savings are estimated at **\$7.5 million** annually.

Electronic P-Card Reconciliation Process

What is it? Since moving to a telework environment, District 3 has developed and implemented an electronic purchasing card reconciliation process.

How is it more efficient? Approved by the Bureau of Office Services as 100 percent compliant with purchasing procedures, employees now have a **remotely accessible** alternate electronic method of reconciliation.

Keystone Environmental Electronic Permitting System (KEES)

What is it? KEES is a standardized tool for PennDOT to electronically submit Chapter 102 and 105 permits to the Pennsylvania Department of Environmental Protection.

How is it more efficient? This improves permit application **accuracy** and **quality**, thus reducing permitting deficiencies and permit authorization delays. Use of the system also **reduces costs** associated with completing, producing, and mailing paper application copies while improving data quality, tracking, and reporting.

Oversized Overweight Truck Permit Modernization

What is it? PennDOT automated how heavy haulers obtain oversize and overweight hauling permits.

How is it more efficient? In its first year of implementation, it is estimated that there have been **approximately 30,000 administrative hours saved by carriers** using the new web application.

P-Card Compliance and Review

What is it? District 3 field staff review invoices to ensure purchasing card holders are using DGS contracts for purchases when contracts exist.

How is it more efficient? Due to the structure of the Commonwealth procurement system, this effort resulted in **greater compliance** with procurement guidelines.

Utility Relocation Management System

What is it? The Utility Relocation Management System (URMS) is an automated solution that electronically captures utility relocation details and milestones and uses schedule-driven workflows to advance the Utility Relocation projects to construction. This automated solution was an upgrade and modernization of the now retired Utility Relocation - Electronic Document Management System (UREDMS).

How is it more efficient? URMS automatically generates and delivers documents, which **saves time** to produce the documents and **increases efficiency** as well as **accuracy**. As projects advance to construction, the Department **anticipates significant cost savings** due to **fewer construction delays** and **increased accuracy** of utility relocation activity data.

Virtual Hands-On Local Acceptance Testing



What is it? PennDOT District 11 implemented Virtual Hands-On Local Acceptance (HOLA) Testing at the onset of the COVID-19 pandemic. This initiative entailed having high-definition cameras installed at an asphalt producer's lab facility, to allow the HOLA testing to continue taking place, while maximizing social distancing to ensure employee safety.

How is it more efficient? District 11 anticipates future **cost savings** as a result of this innovation and, if it becomes standard, it could be an option for 100 percent state-funded projects.

Maintenance Efficiencies

Alternate Work Schedules for Sealcoat Operations

What is it? In PennDOT District 10, Indiana and Jefferson counties implemented Alternate Work Schedules (AWS) for their Sealcoat Operations crews, enabling employees to work four, 10-hour days each week.

How is it more efficient? AWS schedules for the Sealcoat Operations crews reduced overtime and continued to complete jobs efficiently. Using this solution, crews **increased production by 17 percent** while showing an overall **56 percent reduction in overtime costs** across all five counties compared to 2019 overtime costs.

Asphalt Joint and Crack Sealing (J-Band)

What is it? Asphalt Joint and Crack Sealing, or J-Band, is a longitudinal joint sealant product of Asphalt Materials, Inc. J-Band is a hot applied asphalt membrane used to extend the life of longitudinal Hot Mix Asphalt (HMA) joints.

How is it more efficient? This product is resistant to flow and non-tracking within 30 minutes after application to the pavement surface under the longitudinal joint. J-Band migrates 50 to 75 percent up into the HMA void structure after rolling, thus reducing permeability at the joint resulting in **reduced cracking and stripping**, and **improved pavement performance**. This **extends the pavement lifecycle** and **reduces the need for a standard milling and repaving project**. Since repairs are relatively quick, it also reduces the impacts to the traveling public.



Box Culvert Replacements

What is it? Through the hard work of personnel in PennDOT District 12's Design and Maintenance Units, a process was deployed to use Department-force employees to completely design and construct replacement and major rehabilitations of structures within the district.

How is it more efficient? District 12 typically completes three projects per county per year at a **cost savings of approximately 50 percent per structure**. In addition to the time and cost savings, the district has integrated innovative techniques into its projects to advance abilities and skills.

District-Wide Snow Route File Storage

What is it? As part of District 2's COVID-19 contingency plan, all snow route maps, and reduced truck maps were saved to one folder on the IT network. This folder also contained all winter agreements, callout sheets, and other resources needed to run winter operations in each county.

How is it more efficient? Combining all appropriate documents into a single folder **increased access to files** in the event staff members were asked to quarantine, ensuring a member of the district office could access the necessary files and continue to run county snow removal operations.

Electronic Surveys

What is it? PennDOT's District 10 worked with the Bureau of Innovations to design and deploy two customer-facing surveys to solicit feedback related to construction projects and winter road services.

How is it more efficient? The electronic survey for construction replaced paper surveys mailed to residents in the project areas, resulting in **cost savings** and an **easier way for respondents to submit their feedback** to the district. The winter services survey replaced previous, unsuccessful attempts to reach customers by phone. The survey generated a healthy response and helped the district make timely improvements to winter services.

Fleet Wash Quality Assurance Checklist

What is it? PennDOT's District 5 developed a checklist to ensure fleet equipment was being washed thoroughly and on a regular schedule.

How is it more efficient? By creating a checklist for employees to follow, uniformity in truck washing was achieved. This leads to long-term reductions in **equipment repair** and **replacement costs**.

Foreman Crew Cab Truck Conversion

What is it? PennDOT Districts 2 and 11 worked with the Fleet Management Division to purchase and outfit standard crew cab pick-up trucks for use by their crews instead of traditional foreman crew cab trucks.

How is it more efficient? The districts **realized cost savings** of approximately 30% per truck by switching from purchasing the traditional trucks to standard crew cab trucks.



Grizzly Static Material Screener

What is it? PennDOT District 1's Warren County uses a Blueline Static Grizzly Bar Material Screen Plant to filter out millings that do not meet size requirements.

How is it more efficient? By filtering out non-uniform material, the district doesn't have to use excavators and loaders to break down milling clumps that harden over time. It is estimated that Warren County will save **crew costs** and **material costs** over a 5-year period.

Hot Pour Mastics



What is it? Hot Pour Mastics (HPM) is a technique that can be used year-round as a one-time application to fill large cracks and small potholes in concrete and asphalt pavements when surface temperatures are 40 degrees Fahrenheit and rising. It combines the flexibility and adhesion of rubberized asphalt sealants with the strength and load bearing capabilities of engineered aggregates.

How is it more efficient? HPM is a fast and cost-effective technique for cracks, potholes and joint sealing that would usually require base repairs. It provides a durable, water-proof repair that protects the subgrade from further deterioration. In comparison to the traditional cold-patch application, HPM is a permanent solution that **reduces the need for frequent repairs** and **minimizes the set-up of work zones and lane restrictions**.

Implementation of New Highway Maintenance Best Practices

What is it? PennDOT created a program to help county maintenance operations ensure they are operating as efficiently as possible.

How is it more efficient? By using practices identified as best in class, counties are able to **save employee hours** and **dollars**, and **redirect those efficiencies** to other areas in highway maintenance.

Improved efficiency in PennDOT's core county maintenance activities, along with resource balancing and equipment sharing, has resulted in an estimated **\$49 million saved** over the past four years.

Inter-County Snow Removal

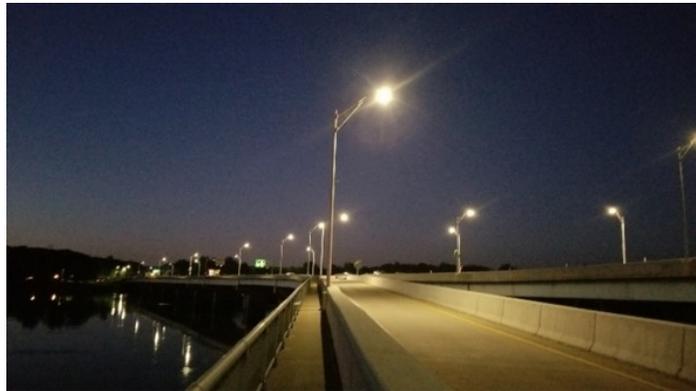
What is it? District 2 redirected resources and utilized Mifflin County trucks to assist with snow removal on the lanes added to State Route 322 in Centre County at the Potters Mills Gap project.

How is it more efficient? This innovation enabled the district to provide a **higher level of service by optimizing routes across county lines** instead of extending snow routes for the Centre County trucks, forcing them to take on additional mileage.

Light Emitting Diode (LED) Highway Lighting

What is it? This initiative encourages the use of LED highway lighting luminaires over traditional High-Pressure Sodium (HPS) lighting luminaires on highways and bridges across Pennsylvania.

How is it more efficient? LED lighting has an **estimated life span of 20 years** with a 10-year manufacturer guarantee and only requires lens cleaning, while HPS luminaires need to be changed and cleaned every three years. Estimates show that overall energy **cost efficiency** of LED luminaires is about **30 percent** when compared to traditional HPS luminaires.



Living Snow Fence

What is it? PennDOT's District 9 is tackling snow and high wind weather events by using plant stakes, in lieu of traditional snow fences, to help improve safety in certain areas prone to snow drifts.

How is it more efficient? Plant stakes **are less expensive to install** than traditional fences and are **maintenance-free**.

Low-Cost Roadway Surface Treatments

What is it? PennDOT created a program using low-cost roadway surface treatments, such as Recycled Asphalt Pavement (RAP), Flexible Base, High RAP Warm Mix Asphalts, etc., on low volume roadways.

How is it more efficient? The use of these low-cost treatments has resulted in an overall savings of **\$38.4 million over three years**. Further, use of these treatments has allowed for the completion of 548.64 miles in comparison to 323.48 miles using traditional treatments, equating to **225.16 additional miles** completed.

Microsurfacing for Longitudinal Joint Repair



What is it? PennDOT District 11's Lawrence County used a microsurfacing treatment to address centerline and edgeline failures on asphalt pavement.

How is it more efficient? Microsurfacing only **costs 25 percent** of the traditional Mill and Fill method, and only takes **60 percent of the working time required to complete**.

Portable Camera Trailers

What is it? District 2 used PennDOT staff to construct portable camera trailers, replacing the time and cost associated with installing pole mounted cameras.

How is it more Efficient? This process is a **direct cost savings** with the portable cameras being substantially cheaper for the Department to build versus constructing new pole mounted cameras. Additional benefits are achieved with the trailer mounted cameras being portable. The cameras can be moved to any location based on operational need including special events.

Redi-Rock Bridge Abutments and Wing Walls

What is it? PennDOT's District 12 used Redi-Rock International products to construct wing walls and abutments for a bridge maintenance project.

How is it more efficient? Use of these products for bridge maintenance **saved an estimated eight weeks in construction time or 1,500 employee hours per year**.

Retrofitted Skid Steer Attachments

What is it? PennDOT District 1's Forest and Warren Counties retrofitted Case Skid Steers and their attachments to allow for attachments to be easily identified and mounted for use on all Case Skid Steer machine models.

How is it more efficient? By retrofitting the equipment for easier mounting and creating a color-coding system for the mounting plates, the Warren and Forest county stockpiles were able to **streamline inventory and reduce the time it took to identify and mount attachments** to equipment. Retrofitting the attachments allowed the counties to delay purchasing new milling heads, at the cost of \$19,465 per unit. This initiative also resulted in an estimated **savings of 100 work hours annually**.

Salt Brine Usage Chart

What is it? By increasing salt brine pre-wet application rates, District 2 was able to reduce the overall amount of salt material needed for snow removal operations.

How is it more Efficient? This creates a **direct budgetary savings from the reduced material usage**. It can also help drive efficiency by helping to **extend the time that trucks can be on the road** before they need to reload with additional material.

Side Dozing Equipment Attachment

What is it? To increase production and promote a more efficient operation, two counties in PennDOT's District 10 repurposed grader and plow blades, a scrap bucket, and purchased a quick connect attachment to create a side dozing equipment attachment for use on roadside areas.

How is it more efficient? By improving side dozing operations, Armstrong and Indiana counties were able to **increase performance rates and reduce costs**.

Snowplow Refurbishment Program



What is it? To combat aging equipment and the ever-rising cost of replacing plows, each year PennDOT District 1's Crawford County maintenance staff thoroughly assess plows for refurbishment or replacement. Those identified for refurbishment are disassembled, repaired, and sent to a vendor for sandblasting and refinishing.

How is it more efficient? This program has extended the life of the plows in Crawford County from **14 years to 24 years**, helping the county save money.

Spreader Cart

What is it? With only one forklift in PennDOT District 11's Lawrence County, installing spreaders was a time- and resource-consuming process. County maintenance staff designed a cart that allows one or two workers safely and efficiently attach and remove a spreader by using an in-house built cart that can be stored in each of the county's stockpiles.

How is it more efficient? The spreader cart **reduces the number of staff needed to put on and remove a spreader**. Additionally, it **reduces time and costs related to transporting the forklift** between stockpiles.

Trenchless Pipe Repairs

What is it? There are multiple methods for pipe replacement, and the overall purpose of this research project is to evaluate alternative methods for open trench pipe replacement.

How is it more efficient? These installations will minimize disruption to the traveling public. Some of the methods include preformed liners, cured in-place technologies, cast-in-place liners, and spray applied liners. This method will **extend the life of the existing pipe** through rehabilitation, saving PennDOT crew time and money for materials and equipment in the long run, as well as **reducing the impacts to the traveling public**.

Truck Rust Preventatives

What is it? Without a Department-owned truck wash facility located in District 5's Lehigh County, trucks were sandblasted and painted with a rust preventative to extend equipment lifespan.

How is it more efficient? By treating frame rails, the front bumper and plow frames, areas of a truck prone to rusting were protected, **repairs were minimal** and **truck lifespan was increased**.

Use of Sand Truck for Fluid Leaks at Crash Scenes

What is it? PennDOT District's 5 Schuylkill County uses a one-ton dump truck with a spreader to respond to highway crashes that include fluid leaks.

How is it more efficient? By having a one-ton dump truck available, any operator can respond to a crash scene to **help improve response and clean-up time**.

Winter Shifts/Dark Hours Operations

What is it? Using winter shifts and dark hours times, PennDOT District 10 employees poured headwalls and completed slide repairs using plans designed by its Geotechnical Unit.

How is it more efficient? The district was able to improve productivity and **save money** pouring headwalls during dark hours. In the past two winters, the district has repaired seven slides using department crews, generating a **cost savings** for the Department by not contracting out these repairs.

Multimodal Efficiencies

Business Aircraft Records & Tracking Invoicing Software

What is it? The Business Aircraft Records & Tracking (BART) invoicing software provides flight scheduling, flight record keeping, and flight invoicing all in one package.

How is it more efficient? BART eliminates a multi-step process for scheduling, entering flight information and invoicing. Use of this software provides for a **time savings from approximately 1.5 hours to 30 minutes per flight** through reduced record keeping. This includes pilot and aircraft time. There is also a **monetary savings after the first year**.

Capital Planning Tool

What is it? The Capital Planning Tool (CPT) is an online asset management tool used by transit agencies to store, maintain, edit, and report on capital assets. PennDOT is using the information available to develop, track and scenario plan for statewide capital needs that involve the replacement, rehabilitation, or major overhaul of all transit capital assets to improve the overall state of good repair of the entire transit system.

How is it more efficient? The CPT streamlines the process of forecasting asset replacement timeframes. This **saves staff time** for both transit providers and PennDOT's Bureau of Public Transportation.

Compressed Natural Gas Public Private Partnership

What is it? Since 2016, PennDOT has been working with a private developer to design, build, operate, and maintain Compressed Natural Gas (CNG) fueling sites through 2037. Currently, 18 stations are completed with five (5) more stations in the design or planning phases.

How is it more efficient? The conversion to CNG will save **annual fuel and operating costs**.

Electronic Payments for Private Airport/Heliport License Renewals

What is it? PennDOT's Bureau of Aviation recently integrated the Commonwealth PAYEZ program into its airport licensing program, thus allowing customers to pay their licensing fees online versus mailing personal checks.

How is it more efficient? The flexibility of accepting electronic payments for license renewals has greatly **reduced the delays of using the U.S. Postal Service** when receiving and processing payments. A monetary savings is not quantifiable.

Facility Capital Program

What is it? This program supports the planning, design and construction of transit maintenance and administrative facilities across the Commonwealth.

How is it more efficient? PennDOT's oversight of facility construction **helps ensure the consistency and quality of the projects** it funds.

FindMyRidePA

What is it? FindMyRidePA is a "one-click, one-call" resource center developed to make it easier for veterans and other individuals to find information about available transportation options and even schedule shared ride trips using a computer or mobile device. FindMyRidePA has been deployed to 11 counties with plans for statewide deployment beginning in 2022.

How is it more efficient? FindMyRidePA allows for shared-ride riders to directly book trips into the Ecolane scheduling software, bypassing the need to call the transit provider and talk with a customer service representative. It is anticipated that the statewide deployment of this system **should reduce the total number of full-time equivalents** required of shared-ride providers for their call centers.

Fixed Route Intelligent Transportation System

What is it? Launched in 2018 and implemented in five agencies to date, this statewide Intelligent Transportation System (ITS) project will provide Pennsylvania's fixed route systems with cutting edge technology that enhances the agencies' ability to provide enhanced customer service. The project

includes the following suite of technologies: computer-aided dispatch (CAD), automatic vehicle location (AVL), video surveillance, and real-time passenger information.

How is it more efficient? Efficiencies are gained through using same technologies and no need to procure separate ITS's in each agency. This single procurement will **reduce the statewide procurement costs** for fixed route ITS equipment.

Modernization of Grant Processing (dotGrants to eGrants)

What is it? eGrants is a coordinated effort with the Department of Community and Economic Development and is considered the standard of governance for Commonwealth agencies. eGrants provides an efficient and standardized all-electronic processing system for all transportation grantees who currently have access to the system.

How is it more efficient? In the areas where it has been implemented, eGrants has **reduced the time period for a grantee to apply and receive a fully executed grant agreement by approximately 30 days.**

Paratransit Scheduling Software

What is it? PennDOT's Bureau of Public Transportation (BPT) deployed the paratransit scheduling software, Ecolane Demand-Responsive Transportation (DRT), to all of its shared-ride service providing grantees in 2018. This replaced the previous practice of the providers procuring their own systems independently and receiving reimbursement through BPT's grant funding.

How is it more efficient? This has helped to **standardize service levels, enhance customer support** through GPS tracking, route development, and an automated call system, and **improves the ability to coordinate service across county lines.** This single procurement also **reduced the statewide procurement, maintenance, and support costs for scheduling and dispatch software** for shared-ride service.

Virtual Airport Planning Sessions

What is it? To ensure the safety of airport and staff members, PennDOT's Bureau of Aviation (BOA) began conducting its airport planning sessions virtually in 2020 due to the COVID-19 pandemic. Using Skype for Business, 67 virtual planning sessions were conducted during the summer in 2020. BOA plans to continue conducting most of its annual planning sessions virtually every year.

How is it more efficient? Associated **travel-costs and time away from the primary worksite were avoided** for PennDOT staff in addition to helping to ensure everyone's health and safety.

Planning Efficiencies

Electronic Progressive Map

What is it? PennDOT's Bureau of Planning and Research is using improved technology to update how the Department manages comments on progressive maps.

How is it more efficient? With an electronic progressive map, the edits are typed into the file. Once the edit is made and verified, the call is moved off the edit tab and onto the completed tab. The electronic progressives are **easier to read and interpret, do not require hard copy preparation or storage, and are easily accessible** from any work location.

Highway Performance Monitoring System (HPMS) Submissions

What is it? By using *HPMSAnalyst* software, PennDOT's Bureau of Planning and Research is able to display, validate and output data that is required by the U.S. DOT and FHWA as part of the annual Highway Performance Monitoring System (HPMS) submittal that states are required to complete.

How is it more efficient? *HPMSAnalyst* allows PennDOT to run every validation FHWA runs when the data is submitted, and review and correct potential data problems before making final data file submissions to the federal government, **saving both time and money** for the Department.

PennDOT Connects Municipal Training and Technical Assistance



What is it? PennDOT Connects is a Department-wide initiative to engage municipal partners earlier in the project development process. This initiative focuses on providing training and technical assistance on a variety of planning and land use topics to municipalities to ensure that they are able to clearly articulate a community vision and express and document how it relates to transportation projects being planned in their communities.

How is it more efficient? The intent of PennDOT Connects is to ensure community priorities and obligations are understood prior to project design and construction **eliminating project delays and cost increases**. This ultimately **improves delivery of service**.

Pitt IRISE (Impactful Resilient Infrastructure Science and Engineering)

What is it? Pitt IRISE is a consortium that includes academia, the public sector, and the private sector that conducts transportation research. IRISE is guided by two main principles: Innovative solutions to highway infrastructure problems can only be achieved through a collaborative program featuring public agencies that own and operate the infrastructure and the private companies that design and build it; and, IRISE must provide implementable solutions that meet the needs of its members, especially in the short-term, to continue to build interest and momentum.

How is it more efficient? The Pitt IRISE consortium allows for each partner to work collaboratively to identify and remove obstacles from the earliest stages of research identification and development, leading the



way to deployment and implementation of important innovations. The unique collective experience and expertise that academia, the public sector, and private sector offer can identify challenges faster and address them earlier in the process. This collaboration can **greatly reduce or eliminate rework and the potential for future delays**, resulting in **improved value** to the traveling public.

Transportation Research, Education and Technology Transfer Services ITQ

What is it? The purpose of the Transportation Research, Education and Technology Transfer Services Invitation to Qualify (ITQ) is to qualify suppliers to perform research, education, and technology transfer services to PennDOT. Vendors are allowed to prequalify under a range of service categories. This allows PennDOT to issue Requests for Quotes (RFQs) that set forth selection criteria, technical skills, past experiences, costs, and diversity program participation.

How is it more efficient? This has streamlined the research contracting model by allowing for a pre-approved set of terms and conditions that suppliers agree to prior to the issuance of an RFQ. **This significantly reduces the time it takes for PennDOT staff to initiate a research project.**

Leveraging ECMS for Permanent Traffic Counting Site Contracts

What is it? PennDOT's Bureau of Planning and Research is leveraging existing technology with the Engineering and Construction Management System (ECMS) to contract and manage construction projects to install new Continuous Automatic Vehicle Classification (CAVC) sites, convert existing Automatic Traffic Recorder (ATR) to CAVC sites, and repair component failures at CAVC sites.

How is it more efficient? This allows for a more efficient way of getting the sites fixed and consistently managing the projects. The use of ECMS **saves time and money** in the contracting process and also allows for the use of pre-approved contractors to do the work, which saves PennDOT staff time in contractor reviews. In addition, it saves staff time by requiring consistent documentation of required work, payment process, and project closeout.

Traffic Data Systems (TDS) Portal

What is it? A series of eight internal applications associated with traffic data, both portable and permanent, are housed together to provide PennDOT easier access to pull data for mandated FHWA reports.

How is it more efficient? Prior to bringing these applications together, data input was required in multiple locations. Through **increased efficiency**, users now have the ability to make one edit that can update all applications.

Traffic Information Repository

What is it? Bureau of Planning and Research uses a Traffic Information Repository (TIRe) web application to provide a comprehensive way to compile, share, and view traffic count sites, and access traffic count data and maps.

How is it more efficient? TIRe provides internal and external customers with the ability to access traffic data for their use electronically, rather than having PennDOT employees manually pull requests, **which saves staff time**.

2023 Twelve-Year Program Public Outreach Process

What is it? The Department's public involvement outreach effort for the 12-year program has been combined with the outreach efforts for Pennsylvania's Long-Range Transportation Plan and the Comprehensive Freight Movement Plan.

How is it more efficient? By combining the outreach efforts for these three plans, the Department can:

1. Effectively engage stakeholders in one survey – improving brand recognition and value without multiple and repeated requests to participate and gathering one set of results across multiple plans to **ensure consistency** in our final products.
2. Efficiently create productivity within the Department – **Time previously spent on these other outreach efforts can now be used elsewhere**.
3. Continue to innovate an already industry-leading process – increasing PennDOT's competitiveness nationally.

Safety and Traffic Operations Efficiencies

Regional Traffic Management Center Chatroom

What is it? The Regional Traffic Management Center (RTMC) Chatroom is a communication tool enabling District 2's RTMC operators and county radio operators to collaborate using a single communication platform.

How is it more efficient? The RTMC Chatroom has **increased efficiency** by ensuring all RTMC operators and county radio operators who are currently on duty have the ability to communicate, ask questions, and assist each other without making additional phone calls.

RTMC Direct Communication with 911

What is it? To increase situational awareness and create more timely responses to emergency situations, 911 centers have been integrated into the District 2 RTMC.

How is it more Efficient? Before integrating 911 centers directly into the district's RTMC, each center would need to contact the RTMC by a direct phone call to relay information. Now, the district can get information at the same time as the 911 centers. As they handle the emergency end of the situation, district staff can immediately begin to implement the necessary traffic control measures. This direct communication helps to **increase our response times to ensure public safety**.

Work Zone Traffic Control (WZTC) Quality Assurance Reviews

What is it? In 2019, District 12 identified a need for additional training and in-field assistance to improve upon county Quality Assurance (QA) reviews. With the help of district, county and PennDOT Operations and Performance Office (OPO) staff, the district made significant improvements to the results of QA reviews in the district.

How is it more efficient? Although there are no direct cost savings associated with this process, it has resulted in **increased operational efficiency** and **less crew down time** while **increasing the number of successful QA reviews**.

Training Efficiencies

Certified Concrete Finishers Course

What is it? The Certified Concrete Finishers Course provides training to PennDOT staff, concrete finishers, and consultant inspectors to better understand the mechanisms that cause scaling, so they are able to better prevent it, identify it, and monitor field practices.

How is it more efficient? The main benefits of this innovation include providing a basic standard in which finishers are trained and certified, which leads to **longer product lifespan**, a **better quality product**, **savings in time and money** on costly repairs and rework, and the ability to have new and existing staff trained in the proper finishing techniques.



Foreman Safety Summit

What is it? As a result of a review of accident and personal injuries, District 12 noticed a need for additional information and training for the Highway Foreman classification. The Foreman Safety Summit was developed to meet these needs.

How is it more efficient? The summit allows for training and open dialogue between management and the foremen, and provides many **increased opportunities** for improved communications, trainings, and operations to focus on the safety of our crews.

On-the-Job Training for Highway Construction Contractor Trainees

What is it? Highway construction contractors hire and train a diverse group of employees. Due to the extensive paperwork that is required to be completed by the contracting community and PennDOT to meet Diverse Business (DB) and Disadvantaged Business Enterprise (DBE) program requirements, an IT solution was built that automates this process.

How is it more efficient? With several hundred trainees hired annually, the automated process saves both PennDOT and the contractor **one hour each of administrative time** per trainee.

Stormwater Management Training and Field Guidebook



What is it? The Stormwater Management Training and Field Guidebook helps maintenance crews at PennDOT, other state agencies, and local governments care for Stormwater Control Measures (SCMs), such as retention ponds, sand filters, pervious pavement, and constructed wetlands. The training provides maintenance employees with the necessary education and tools for the correct installation and maintenance of SCMs to ensure compliance with federal and state environmental permitting requirements.

How is it more efficient? Regular maintenance of SCMs **preserves functionality, extends service life, and reduces the need to replant or reconstruct**, thus saving money.

Virtual Training of Maintenance Employees

What is it? With the introduction of virtual trainings, the Department was able to deliver core maintenance training to more than 3,500 employees.

How is it more efficient? With transition to virtual training, the Department has realized **travel and administrative cost savings**.