CALIFORNIA DEPARTMENT OF TRANSPORTATION

IMPROVING EFFICIENCY THROUGH DATABASE CREATION

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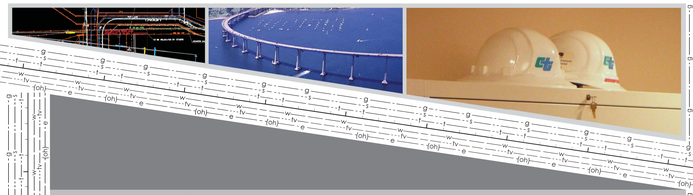
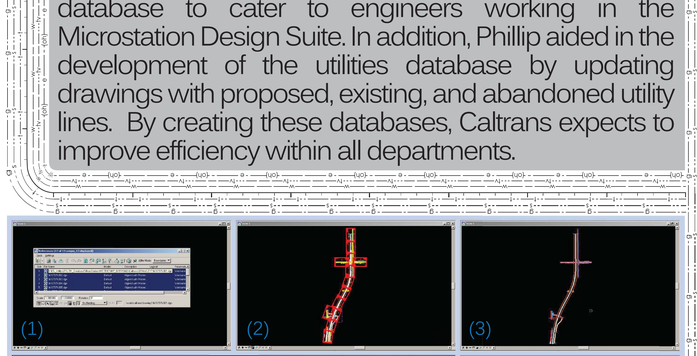
STEP Partnership of San Diego (SPSD)



Introduction

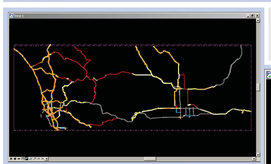
Caltrans aims to improve mobility across California. Caltrans, in collaboration with the local Metropolitan Planning Agencies, allocates taxpayer dollars to various transportation projects around the State. Our group reports to the District 11 headquarters, which deals with projects within the San Diego and Imperial Counties. Phillip assists the engineers in the Utilities Department, while Aleksandr and Derek help the CADD (Computer Aided Drafting and Design) Department; our group resides under the Design Division.

Caltrans employees utilize Microstation, computer aided drafting software, and Microsoft Access, database generating software, in coordination to create a comprehensive database of drawings. Derek and Aleksandr have assisted in the establishment of a database to cater to engineers working in the Microstation Design Suite. In addition, Phillip aided in the development of the utilities database by updating drawings with proposed, existing, and abandoned utility lines. By creating these databases, Caltrans expects to improve efficiency within all departments.

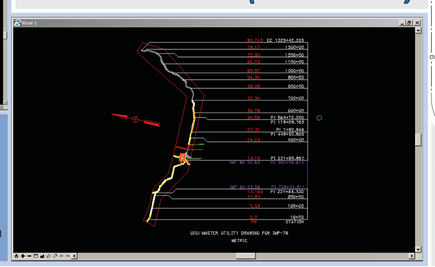


Updating the Utility Database
[descriptions match numbered photos]
(1) From a New file, reference drawings from the "Records of As-Builts"
(2) Consolidate the reference drawings into a single editable drawing
(3) Clear the drawing of extraneous information
(4) Draw in utility lines from drawings both in-house and from third-party companies

Procedures (Utilities)



Isolation of Individual Routes
(Above) All routes in District 11 are referenced, including post-mile, right-of-way, and alignment information
(Right) View of a completely isolated route, labeled with corresponding stations

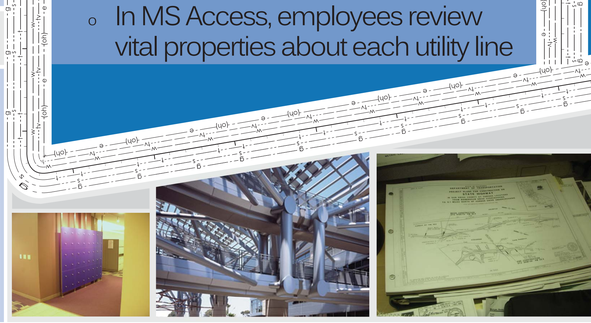


Methods (CADD)

- The utilization of Bentley Microstation CAD software in order to refine the existing drafts of different typical elements of roadway details
- The removal of superfluous data and abstraction of specific design components
- The exporting of a copy of the file for in-house plotting applications (iplot)
- Lastly, PDF's are created for simplified online viewing

Methods (Utilities)

- The utilization of Microstation to update utility lines based on "as-built" drawings provided in-house (intrarelationships) and by other utility companies (interrelationships), such as: SDG&E, COX , AT&T, etc.
- The isolation of individual Master Utility drawings
  - Once isolated, each route is labeled with important features, including: stations, post-mile information, and street labels
- Nodes are assigned to each utility line
  - Established communication between Microstation and MS Access allow additional information to be attached to each node
  - In MS Access, employees review vital properties about each utility line

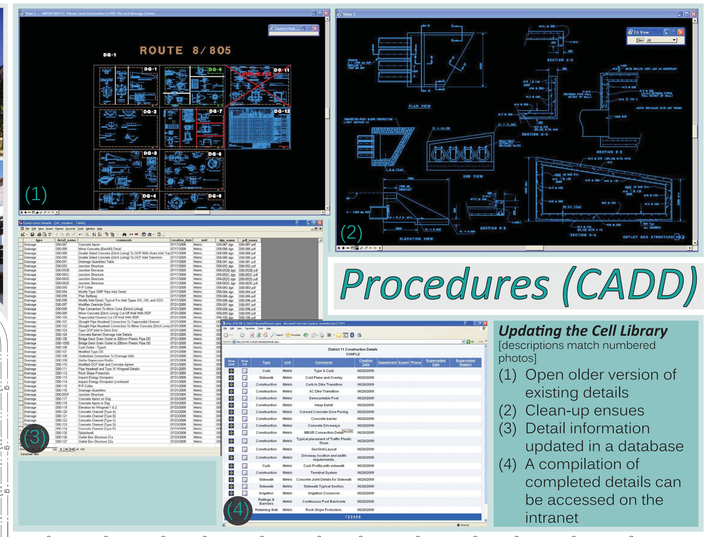


Results (CADD)

- The creation of a database utilizing Microstation and PDF components to ease deployment of design elements as needed
- A system in which all Divisions may contribute and make amendments
- A database readily available to employees with intranet access

Results (Utilities)

- The creation of a comprehensive utility database would resolve former hindrances
  - Before the proposal of this database, engineers would have to wait several months to see if their design conflicted with existing utilities
  - Without prior knowledge of utility layout, construction workers could potentially strike a utility line, resulting in further problems
  - Prior record of existing utilities could prevent unnecessary realignment, incurring costs



Procedures (CADD)

Updating the Cell Library
[descriptions match numbered photos]
(1) Open older version of existing details
(2) Clean-up ensues
(3) Detail information updated in a database
(4) A compilation of completed details can be accessed on the intranet

Conclusions

In conclusion, we participated in tasks that could likely improve project efficiency. We gained a basic knowledge of Microstation as well as refining our Access skills. Furthermore, we helped in the development of databases that can be utilized by Civil Engineers within District 11 Headquarters. Having participated in meetings, we gained an understanding of infrastructure and function. Caltrans encourages the correlation between departments; in addition, we have witnessed collaborations between this company and others. Lastly, networking was an important part of our internship, meeting Professional Engineers, Project Engineers, and Managers of different departments. These connections enable us to pursue future jobs and relationships within the engineering community.

Acknowledgements

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