

第VI 部門 Operation and Maintenance Data Management of Road Facilities based on COBie

大阪大学大学院工学研究科	学生会員	○Chung, Mariana
大阪大学大学院工学研究科	フェロー	矢吹 信喜
大阪大学大学院工学研究科	正会員	福田 知弘
大阪大学環境イノベーションデザインセンター	非会員	道川 隆士
大阪大学	非会員	Motamedi, Ali

1. Introduction

Roads and their accompanying facilities ensure mobility, deliver services, and aid economic progress. Almost everyone uses them daily to commute to stations or access to services. Proper maintenance will ensure they provide good service and potentially extend their useful life which leads to economic and resource savings.

To achieve efficient Operation and Maintenance processes (O&M) accurate inventory and access to asset information is necessary. This research focuses on solving problems related to traditional methods in which O&M data for road maintenance is acquired and maintained. Traditional data handover is in the form of paper files or at best as none standard proprietary digital databases. Moreover, most often, there is no interoperability or standard data exchange method of this data, which makes it necessary to recreate what has already been created previously in design and construction stages of the project.

Construction Operation Building information exchange (COBie) is used in the building industry to solve the above mentioned problems. However, it is still not defined for infrastructures. COBie gets asset information directly from the Building

Information Modeling (BIM) model through the use IFC formatted BIM files. The use of BIM and COBie as a data source and standard has proven to be beneficial for gathering good inventory data for preventive maintenance and reduce the need to recreate data that has already been generated in the design and construction phases of the projects ¹⁾.

The objective of this research is to establish the data required for the maintenance of road facilities, specifically streetlights and guardrails from a BIM model of a road and display this data as a COBie based spreadsheet format.

2. COBie based road management

A road facility includes a variety of assets, which include but are not limited to pavement, drainage facilities, lighting systems, railings, bus stops, signage, and traffic systems. Furthermore, it includes structures such as bridges, tunnels and train stations.

Streetlights and guardrails were chosen as target of this paper as these assets already exists in one of the BIM software used for modeling the case study and are similar to assets found in buildings.

Figure 1. shows a traditional road facility with most commonly found assets. Highlighted are the assets that are the focus of this research.

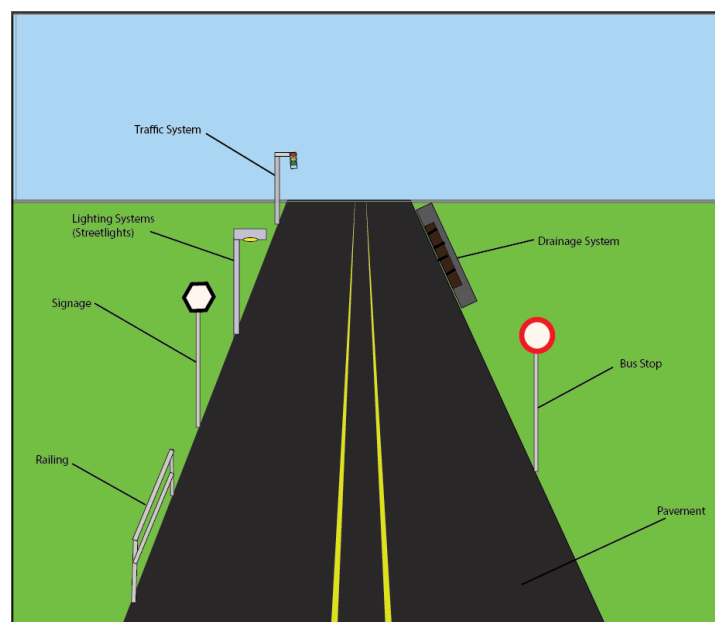


Figure 1. Developed road model illustration

3. Methodology

Approach of this research is displayed in Figure 2.

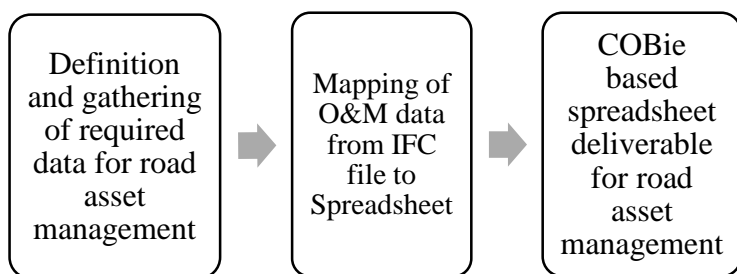


Figure 2. Approach of this research

Suggested modifications to some spreadsheets based on recommendations from the COBie for All standard developed by the BIM task group ²⁾ are as follow:

- 1) Facility Worksheet and Coordinates Worksheet: column for referencing geospatial location of assets.

- 2) Space Worksheet: columns for GIS or geospatial database, picklist for infrastructure to specify the feature class and specify feature id of the GIS or geospatial data.
- 3) Component Worksheet: additional columns for referenced coordinates, distance along, and offset.

Figure 3. shows the addition of required data into one of the original COBie spreadsheet.

ExtSystem	ExtObject	ExtIdentifier	ClockwiseRotation	ElevationRotation	YawRotation	Coordinate Reference System	Referenced Coordinate	Distance Along	Offset
Autodesk	Autodesk	Autodesk	0	0	0				
Autodesk	Autodesk	Autodesk	0	0	0				

Figure 1 Developed modified spreadsheet for use in the data handover

4. Conclusion

This methodology can potentially be useful for automation of data exchange for road facilities maintenance between the contractors and the clients.

The undefined IFC standards for sharing infrastructure models and inability of software to export models in this format.

References

- 1) Lavy, Sarel and Jawadekar, Salil. A case study of Using BIM and COBie for Facility Management. International Journal of Facility Management, Vol. 5. 2150-3303. United States. 2014.
- 2) Nisbet, Nick and Scarponcini, Paul. COBie for All; Building and Civil Infrastructure. BIM Task Group, V. 1.3. 2013.