

Abstract

In recent years, programming has gained increased traction, due to its potential as an applied tool across sectors, such as the Architecture, Engineering, Construction, and Operations (AECO) industry. Unfortunately, the lack of efficient BIM interoperability, due to numerous documented software communication problems, continues to greatly limit the emergence of creativity and collaboration in the AEC industry. To address this gap and familiarize structural engineers with the possibilities that programming offers, this thesis demonstrates workflows that can be used for the betterment of collaboration between architectural and structural disciplines. Namely, through the use of Dynamo, Excel, Python, and Machine Learning concepts it is possible to transfer architectural features seamlessly from Revit to SAP2000 and back. Moreover, algorithms that automatically design structural members and group them to ease constructability in the field can also be developed. As a disclaimer, the proposed solutions are not foolproof solutions, but rather comprise building blocks that can be further developed into finished products.