UNIVERSITAS
GADJAH MADA
Pengembangan Sistem Prioritas Clash Detection Berbasis BIM Pada 3D Coordination Menggunakan Plugin Pyrevit
Dzakki Rabbanii Aznur, Ir.Teguh Sudibyo, S.T., M.T, Ph.D., IPU.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

INTISARI

Koordinasi tiga dimensi (*3D Coordination*) dalam *Building Information Modeling* (BIM) digunakan untuk menemukan benturan antar elemen bangunan sebelum konstruksi, sehingga dapat mengurangi pekerjaan ulang dan biaya. Namun, hasil pemeriksaan sering menampilkan banyak benturan tanpa urutan penanganan yang jelas. Kondisi ini dapat menyulitkan tim menentukan benturan yang perlu diselesaikan terlebih dahulu. Penelitian ini bertujuan mengembangkan sistem pemeringkatan prioritas benturan berbasis BIM yang mengikuti rencana pelaksanaan BIM (*BIM Execution Plan*) dan dapat digunakan langsung di Autodesk Revit.

Penelitian dilakukan pada model gedung dua lantai. Metode yang digunakan meliputi penyusunan rencana koordinasi 3D berdasarkan *Penn State BIM Project Execution Planning Guide v2.2*, penerapan indeks benturan (*Clash Index*) dengan pembobotan *Best-Worst Method*, serta pengembangan *plugin* pyRevit ClashManager. Indeks benturan dihitung dengan rumus CI = P × WS × WMEP × U. Sistem mengelompokkan benturan ke dalam tiga tingkat prioritas, yaitu tinggi, sedang, dan rendah, serta menyediakan navigasi satu klik dari daftar benturan ke lokasinya di Revit.

Model studi kasus menghasilkan 133 benturan fisik antara elemen struktur dan sistem mekanikal, elektrikal, serta plambing. Seluruh 133 entri data XML berhasil dibaca (100,00%), dan hasil perhitungan indeks tidak menunjukkan perbedaan dibandingkan pemeriksaan manual (0,00%). Uji fungsi pada contoh benturan dengan prioritas tinggi, sedang, dan rendah menunjukkan bahwa rute utilitas dapat disesuaikan tanpa mengubah kekakuan elemen struktur. Status penyelesaian benturan dikonfirmasi melalui pemeriksaan ulang di Autodesk Navisworks Manage. Dengan demikian, sistem yang dikembangkan dapat membantu tim mengurutkan dan meninjau benturan secara lebih terarah.

Kata kunci: *Building Information Modeling*, koordinasi 3D, *BIM Execution Plan*, deteksi benturan, *Clash Index*, *Best-Worst Method*, pyRevit.

UNIVERSITAS
GADJAH MADA
**Pengembangan Sistem Prioritas Clash Detection Berbasis BIM Pada 3D Coordination Menggunakan Plugin
Pyrevit**
Dzakki Rabbanii Aznur, Ir.Teguh Sudibyo, S.T., M.T, Ph.D., IPU.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

ABSTRACT

Three-dimensional coordination (3D Coordination) within Building Information Modeling (BIM) helps identify conflicts between building elements before construction, reducing rework and associated costs. However, conventional coordination reports can contain many clashes without a clear order for resolution, making it difficult for teams to decide which issues should be addressed first. This study aims to develop a BIM-based clash prioritization system guided by a BIM Execution Plan (BEP) and operated directly in Autodesk Revit.

The system was developed and tested using a two-story building model. The method comprised preparing a 3D coordination plan based on the Penn State BIM Project Execution Planning Guide v2.2, applying a weighted Clash Index using the Best-Worst Method, and developing the pyRevit ClashManager add-in. The Clash Index was calculated using the formula $CI = P \times WS \times WMEP \times U$. The system classifies clashes into three priority levels—high, medium, and low—and provides one-click navigation from a clash list to its location in Revit.

The case-study model contained 133 physical clashes between structural elements and mechanical, electrical, and plumbing (MEP) systems. All 133 XML data entries were read successfully (100.00%), and the calculated index values showed no discrepancy compared with manual verification (0.00%). Functional tests on representative high-, medium-, and low-priority clashes showed that utility routes could be adjusted while preserving structural rigidity. Clash resolution was confirmed through a follow-up check in Autodesk Navisworks Manage. These findings indicate that the system can help coordination teams prioritize and review clashes in a more structured way.

Keywords: *Building Information Modeling, 3D coordination, BIM Execution Plan, clash detection, Clash Index, Best-Worst Method, pyRevit.*