The Evolving Metropolis
2019 IABSE Congress
New York City

IABSE 90 YEARS

The Krause Gateway Center

Thomas Reynolds

Associate

Silman

New York, NY, USA
reynolds@silman.com

Thomas Reynolds, born 1983, received his BS in Civil Engineering from Manhattan College and has been a structural engineer at RSA since 2005.

1 Abstract

The selection of a building superstructure framing is the result of many different factors. There are cost, constructability and physical constraints that govern a designer's ability to utilize a particular material when laying out the framing for a new structure. The ability to achieve an architect's and owners vision has to be woven into this decision-making process as well. The Krause Gateway Center in Des Moines Iowa represented challenges that were not easily solved with one material or something previously seen in an office building. The plan layout, the extreme cantilevers and other geometric constraints demanded materials and options that are flexible and provide the opportunity to be built and modified in ways not typically seen. Structural steel framing (after many rounds of test fits and studies of post tensioned concrete and other precast ides) was chosen for its ability to be built and designed to meet the needs of the building in ways other materials could not.

Keywords: steel, cantilever, plate girder, web opening, braced frames

2 Introduction

The 6-story, 100-foot-tall, 160,000 square foot building is framed using structural steel beams and columns. The double height lobby (29 feet tall), 60 foot and 30 foot column spacing, extreme cantilevers beyond the façade, the transparency of the façade at each floor (the entire building is wrapped in glass to enhance the view to the sculpture park across the street) and the need for a thin structural sandwich to accommodate the desired floor to floor heights and MEP were all challenges that were solved using structural steel.

The design of the building followed the International Building Code (IBC) 2012 as stipulated by Article III of the Des Moines, Iowa Code of Ordinances. Other standard additional design codes such as ASCE 7-10, ACI 318 and AISC were utilized for loading requirements and material specific requirements.

3 Design Challenges

3.1 Below Grade

The building structure at and below grade is all cast in place concrete. The ground level slab and the first level below grade utilize 12" thick two way cast in place concrete slabs (studs rails were used at column-slab interaction to help control punching shear and keep the slab thickness down). These slabs are supported by a 30 foot by 30-foot grid of 30 inch square concrete columns as well as 12" thick 22 foot tall perimeter concrete foundation walls.

https://doi.org/10.2749/newyork.2019.2559
Distributed by Structurae