



Evaluating Existing Structures due to Adjacent Construction

Jenna R. Halpern, P.E., James W. Feuerborn Jr., P.E., Luciana Balsamo, Ph.D., Jessica McCoy, Jason Wu

Thornton Tomasetti, Inc., New York, NY, USA

Contacting author: jhalpern@thorntontomasetti.com

Abstract

In dense urban environments like New York City, structures are constantly erected on lot lines and abutting existing, often historic, structures. Renovations and new construction adjacent to older lot line structures are especially challenging and risky. The need for protecting adjacent properties during construction operations is hence necessary. Instrumental to this effort are structural evaluations and monitoring of the structures adjacent to construction sites. This paper will discuss the strict requirements for structural evaluation and specific assessment techniques for buildings adjacent to construction sites in New York City and internationally.

Keywords: lot-line construction; historic structures; building monitoring; building protection; construction monitoring plan.

1. Introduction

Renovations and new construction adjacent to historic lot line structures are unavoidably challenging and risky. In dense urban environments such as New York City (NYC) almost every construction site has an adjacent lot line structure. The building code in NYC has strived to protect adjoining structures by providing stringent regulations for assessing and monitoring adjacent historic structures. Moreover, proper construction protection and structural condition assessment can also mitigate or even avoid the aforementioned dangers and risks.

2. Existing Buildings

2.1 Types of Structures

The vast majority of structures adjacent to renovation and construction sites in NYC and the UK are historic and they present the most stringent standards for building protection. Typical structural

framing systems for these older buildings consist of unreinforced brick masonry load bearing walls with timber framed floors supported on stone rubble or masonry foundations, with no dependent lateral system. Most of these structures were originally constructed as shared-party-wall buildings. A party wall is a shared wall that provides a fire division between two buildings on an interior property lot line [1]. These structures also contain a shared lateral system, where the party walls are prevented from outward movement by the floor diaphragm of the adjacent structure.

2.2 Construction Effects on Existing Buildings

Demolition or structural renovation of these historic buildings removes the floor diaphragms that brace these party walls. If during renovation or construction, the floors of the adjacent structure are removed, the party wall will need to be tied back to the floor joist system of the remaining adjacent structure. Additionally, undermining of