Sheet Pile Design by Pile Buck

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Introduction

Books, like any other enterprise, have stories behind them, even supposedly "dry" technical books such as this one. This one's story is a little more interesting than most.

When it was first published in 1986, the *Pile Buck Steel Sheet Piling Design Manual* quickly became the standard manual for sheet piling design. It came at a time when the manufacturers' published manuals on the subject were rapidly becoming a thing of the past, in the U.S. at least. The changes that were taking place at the time—and certainly since then—have only reinforced the need for a book on this subject published by an entity other than a manufacturer of sheet piling.

Harry A. Lindahl, P.E., who was the chief applications engineer for U.S. Steel for many years, did the vast majority of the work on the original book. Both Mr. Lindahl and Christopher Smoot, publisher of Pile Buck, recognized that even a classic such as the *Steel Sheet Piling Design Manual* needed updates and additions. The writing of the new edition began almost immediately after the publication of the original. Mr. Lindahl was in the process of writing the new book when his work was interrupted by his sudden and untimely death in 1992, and this book is dedicated to his memory.

In the intervening years, the introduction of sheeting such as aluminium, vinyl and pultruded fibreglass sheeting only made a new book even more necessary, and so Chris Smoot turned to me to finish this work. It has been an interesting task because sheet piling is unique in many ways. There are few design elements of geotechnical engineering where the geotechnical and structural aspects of the design are so closely intertwined. Moreover, from an aesthetic standpoint, one cannot look at the various types of sheet pile structures, especially cofferdams, without being impressed as to the visual impact of the structure. Sheet piling does in fact have a sort of "structural art" all of its own, especially when properly installed, something that most geotechnical design elements sorely lack.

This book contains many additions and revisions from the previous work; some of these are as follows:

- ❖ Inclusion of non-ferrous sheet piles, which led to the book's name change to the *Sheet Piling Design by Pile Buck*
- ❖ Addition of extensive information on the seismic design of sheet pile walls.
- ❖ An expanded treatment of lateral earth pressures and . . other loads on sheet pile walls.
- ❖ Addition of information on "non-classical" methods of sheet pile wall design, and an overview of LRFD with sheet piling.
- ❖ Information on transverse bending, which is a relatively new phenomenon recognised in sheet piling.
- ❖ A section on corrosion and corrosion protection.

There are two other items that need to be noted.

The first concerns the use of public domain publications. Pile Buck has a long tradition of making available many of the public domain publications that are put out by the U.S. Government. In this work we have incorporated many of these; however, our practice is to integrate these into the text rather than present them as separate works. We have listed in the back those publications that we have used; however, we should make a special note of two that have been especially used:

- ❖ Ebeling, R.M., and Morrison, E.E. *The Seismic Design Of Waterfront Retaining Structures*. NCEL Technical Report R-939. Port Hueneme, California: Naval Civil Engineering Laboratory, 1993.
- ❖ Department of the Army, U.S. Army Corps of Engineers. *Design Of Sheet Pile Cellular Structures Cofferdams And Retaining Structures*. EM 1110-2-2503. Washington, DC, 1989.

The second concerns the worked examples. The calculational capacity available to design engineers has grown significantly since the original work was published. We have added many new problems and reworked ones from the original work as well. We have also employed computer software for the analysis of sheet pile walls. The most important one is *SPW 911 v. 2*, the sheet pile analysis software available from Pile Buck. We have also used other software packages, including CFRAME, the structural analysis program form the U.S. Army Corps of Engineers, and the academic version of two other programs: Maple V Release 4 for the Macintosh from Waterloo Maple, Inc., and SEEP-W, which is part of the GeoSlope Office from Geo-Slope International, Ltd.

So now we commend this work to our readers, hoping that its use will result in many successful sheet pile designs.

Don C. Warrington, P.E.
http://www.vulcanhammer.net

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