



**PILE DRIVING  
CONTRACTORS ASSOCIATION  
SHEET PILE COMMITTEE**

**FREQUENTLY  
ASKED QUESTIONS**



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## A. General Introduction



Steel sheet piling (SSP) is a hot-rolled or cold formed structural shape with interlocks on the flange tips. The interlocks allow individual sections to be connected to form a continuous steel wall that is earth-tight and water resistant. Because it is readily available and transportable, SSP is in many cases a fast and economical solution to an owner's need for a durable, long lasting wall system. Steel sheet piling is designed to retain soil and or water and may also carry axial and vertical loads. Applications are far-reaching, and include, for permanent construction, marine berthing structures, levee walls, retaining walls, bulkheads, bridge abutments, graving docks, cut-off walls, mooring dolphins and pier protection cells.

Common uses also include temporary structures, such as trenches, cofferdams for building excavations, bridge piers, and lock and dams on the inland river system. At the end of the project, the steel sheet piling can be extracted, and the steel reused.

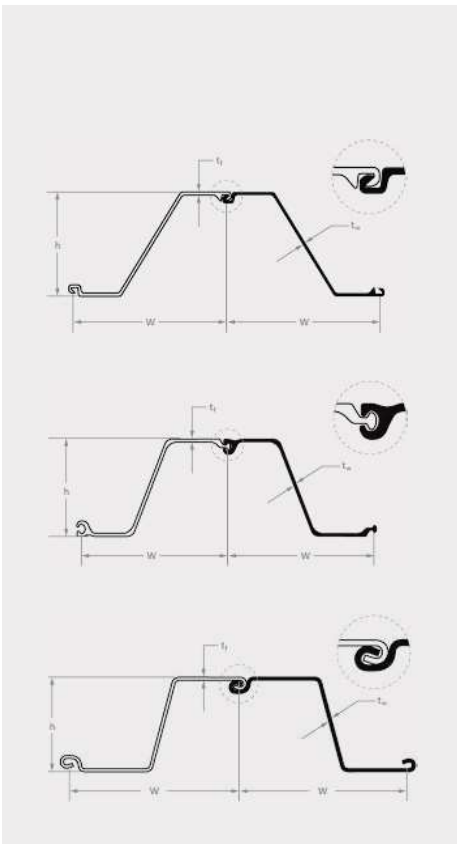
## B. What is Steel Sheet Piling Designed For? And How Readily Available Is It?

The most common SSP end use is for sections that resist bending moment. These applications include retaining walls, cofferdams and other structures where lateral loads impart bending stresses into the structure. This requirement for beam strength, or section modulus, is provided by Z-profiles.

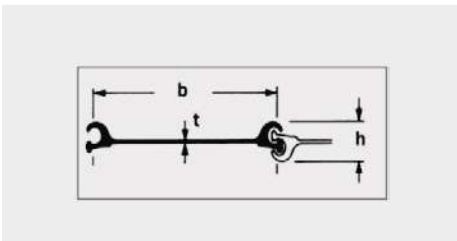
Straight, or flat web, steel sheet piles are used to form circular cells that are filled with granular soil. The fill pushes-out against the sheet piling and places the interlocks in tension. In this application it is the interlock strength rather than the section modulus, that is the most important design parameter. These cells may function as single structures such as mooring cells or bridge pier protection cells. They are commonly connected together with arcs to form continuous walls to function as bulkheads, cofferdams, and similar structures.

All types of steel sheet piling are readily available from domestic mills and also through various import channels. Contact your local representative for specific delivery lead times.

While the interlocks of sheet piling are to varying degrees water-resistant, sealant products are available to fully seal the interlock and to eliminate seepage almost completely. Sealants are commonly used in applications such as cut-off walls in locks & dams, in cofferdams in water and for cut-off walls at hazardous waste sites.



Z-type Sheet Pile



Flat Web Sheet Pile



Steel sheet pile locks filled or being filled with sealant

## C. How Is Sheet Piling Installed?

Installation of steel sheet piling is done with variety of equipment and methodologies. Some sheet piling and some types of equipment are not suitable for every soil type. It is critical that there is a thorough geotechnical investigation so the contractor can pick the right equipment and accurately estimate production rates.

The choice of a suitable driving system is of fundamental importance in order to ensure a safe and successful pile installation. Driving systems can be classified as impact, vibratory or press. Impact hammer types include air, hydraulic, or diesel. They involve lifting a weight a given distance and either allowing it to freefall or forcing it down onto the pile head. Vibratory hammers clamp onto the top of the sheet piling sections and through a combination of vibration and hammer weight push the piling into the soil.

Press-in attachments also clamp onto the top of sheet piling sections and primarily use the weight of the rig to hydraulically press sheet piling into the ground. Press-in machines use the machine weight in addition to the extraction resistance of the sheet piling already installed to continue pressing piles into the soil hydraulically. The type of pile driving equipment used will depend upon site conditions and available types of drivers.

### Will the installation create noise or vibration problems?

At most sites there will be no concerns. However, when installing sheet piling in residential or urban areas there may be noise complaints by nearby residents. These concerns can be minimized by limiting the hours of pile driving. There are also installation tools and equipment including hydraulic press-in machines and press-in attachments available which press the sheet piling into the ground, thereby eliminating both impact noise and vibrations.



Steel sheet piling is installed by foundation contractors who specialize in pile foundations

## D. How Is Sheet Piling Specified?

Hot rolled steel sheet piling is an engineered product meeting one of several applicable ASTM specifications. These specifications, combined with the SSP manufacturer's quality control program, produce a quality product that is ductile, durable and of high strength.

Sheet piling is produced to meet one of several applicable ASTM specifications. Most sheet piling is currently produced to ASTM A 572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel, Grade 50 and 60, but may also be available in Grades 65. Additional grades of steel are sometimes specified including ASTM A 588, Standard Specification for High-Strength Low-Alloy Structural Steel is used for atmospheric weathering applications. Certain marine steel grades such as ASTM A 690 Standard Specification for High-Strength Low-Alloy Steel is used in Marine Environments.

Although no longer commonly produced, ASTM A 328, *Standard Specification for Steel Sheet Piling*, with a minimum yield strength of 269 MPa (39 ksi), is the original ASTM sheet piling specification



## E. Will Steel Sheet Piling last? How Does It Compare To Concrete Lifespan?

With proper engineering a sheet piling structure can be designed to have as long or longer design life compared to concrete. There are many examples of concrete marine structures at failure long before their anticipated life expectancy. This is largely due to the mistaken notion that concrete will last indefinitely when in fact concrete breaks down over time due to porosity, as carbon dioxide or sulphates reach the rebar leading to spalling and failure. There are numerous ways to add design life to a steel sheet piling structure to meet specific design life requirements.

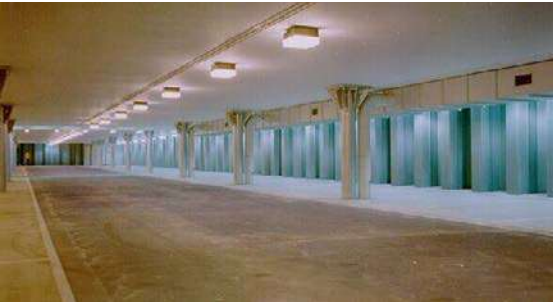
In fact, construction in West London, UK, recently unearthed steel sheet piling over 80 years old. When pulled from the native wet soil, the sheet piling was so well preserved, the original mill marks could be seen. Steel sheet piling in continuously submerged conditions tend to have relatively low to non-existent corrosion rates, because oxygen levels decrease with depth. Sheet piling is also a zero-waste product: after extraction, they can be reused or 100 percent recycled.

## F. Can Steel Sheet Piling Carry Structural Loading?

Although steel sheet piling is often used to carry lateral loads from soil and water pressures, sheet piling can also be designed to carry both lateral and vertical loads.



Sheet piling forming the abutment walls in rail and road bridges is a typical example of carrying both lateral and vertical loads



## G. Does Sheet Piling Have Any Aesthetic Appeal?

The days of having only a black colored coating system are long past. The use of aesthetic coatings can transform a sheet piling wall into an architectural feature of the structure.

The corrugate profile look of sheet piling lends itself for use in the finest architectural finishes.



## H. Is There a Green Aspect with Steel Sheet Piling Use?

This manufacturing process is one reason steel sheet piling is viewed as a green product. Steel sheet piling producers obtain their steel from the electric arc furnace process, which utilizes selected recycled steel scrap. They can produce steel to exacting specifications while utilizing a scrap content of the finished steel in the range of 99 percent. In addition to being produced as a green product, sheet piling is installed in a manner that produces no spoils. Therefore, there is no risk of exposure to hazardous or contaminated materials. At the end of a structure's life, the steel piling can be extracted and either reused, if in good enough condition, or recycled. From cradle to grave, steel sheet piling is easy on the environment.

## I. References

- a. Sheet Piling Installation Guide – PDCA 2019
- b. Steel Sheet Piling Corrosion Guide – PDCA 2019
- c. Retaining Wall Cost Comparison Guide – PDCA 2019
- d. Noise & Vibration Database – PDCA 2019



**Pile Driving Contractors Association**

*– A Driven Pile Is A Tested Pile*