

HANDLING SAFETY FACTORS FOR NON-REINFORCED CONCRETE PIPE

The question of handling and corresponding factors of safety is typically addressed in understanding the performance of non-reinforced concrete pipe. The handling of the product is no different than the handling of reinforced concrete pipe.

Handling safety factors, as presented in the following table, provide assurance to the Engineer and Contractor that 12" diameter through 36" diameter non-reinforced concrete pipe can be safely handled without any additional procedures or costs.

These safety factors are determined by the ratio of the ultimate moment capacity to the moment due to pipe weight that is developed by lifting the pipe or by placing the pipe on a firm non-yielding foundation. While such a hard foundation is not recommended for any pipe, the calculated safety factors assume worst case condition.

$$\text{Safety Factor (S.F.)} = M_{\text{Ultimate}}/M_{\text{Handling}}$$

As an example, a 24" diameter, 3" wall, non-reinforced concrete pipe has a calculated ultimate strength moment per foot of length of 14,400 in-lbs and a calculated handling moment due to pipe weight of 733 in-lbs. Setting the ratio of ultimate moment to handling moment (14,400/733), a handling safety factor for the 24" pipe is determined to be 20.

HANDLING SAFETY FACTORS

Dia.	B-Wall	M _{Ultimate} In-Lbs.	M _{Handling} In-Lbs.	Safety Factor
12"	2"	8,000	131	61
15"	2-1/4"	9,618	224	43
18"	2-1/2"	11,249	352	32
21"	2-3/4"	12,855	519	24
24"	3"	14,398	733	20
27"	3-1/4"	15,841	996	16
30"	3-1/2"	17,147	1,316	13
33"	3-3/4"	18,278	1,697	11
36"	4"	19,196	2,145	9