

Corrugated Steel Structures

DEVELOPMENT

The advantages of corrugated steel culverts have been recognised by consulting engineers for use in Europe and Africa for decades. The ten inherent economies of corrugated metal structures are the following:

- Economy of transport because of the stacking nature of the product.
- Installation by unskilled labour with minimum supervision.
- No mechanical plant required for installation.
- Backfilling can take place immediately after installation.
- No breakages.
- Excavation quantities reduced.
- Saving on design and engineering time.
- Structures can be extended, or salvaged and reassembled as changes in conditions occur.
- Shop fabrication of complicated specials.
- Long service life.

PRODUCT CHARACTERISTICS STRENGTH

Corrugated steel pipe structures have the ability to withstand both the massive dead loads of high embankments or the live load forces from highway, railway and airport traffic, under shallow covers.

A buried corrugated steel pipe acts as a flexible conduit which relies only partly on its inherent strength to resist external loads. In deflecting under load, the horizontal diameter tends to increase, bringing into play the passive resistance of the side fill, which in turn acts to restrain further deflection and helps to support the vertically applied load. Pressures are distributed around the pipe and utilise the compressive strength of the steel ring to transmit the loads.

Rigid pipes do not act in this way and rely on their inherent strength to resist external loading.

Due to this mechanism, tests carried out by the road work committee of the American Rail Way Engineering Association (AREA) at Verina Illinois show that flexible pipes attract less load than the mass of the earth over them whilst rigid pipes in fact attract a far greater load than this. Patently flexible pipes are more suitable than rigid pipes for installations in poorer ground since they will readily accommodate the forces from embankment settlement which tend to crack or distort rigid structures. The wide range of steel thicknesses available enables the engineer to design a structure economically to meet his particular loading requirements. Load tables for the various structures are available upon request.

LONG SERVICE LIFE

Thousands of galvanized corrugated steel structures have been examined over the past 60 years with reassuring evidence of both structural and material durability.

In Southern Africa, regular inspection of the condition and performance of corrugated steel structures dating back to the 1920's confirms international experience and approval of this material. All corrugated steel structures manufactured by Armco Superlite are hot-dipped galvanized to SANS 121/ISO 1461 specifications. For severely corrosive conditions special coatings are available. If severe invert wear is anticipated the invert may be paved. Details of these coatings are available upon request.

VERSATILITY

Corrugated steel conduits are supplied in a vast range of shapes, sizes and thicknesses. Applications include culverts, stream enclosures, underpasses, service ducts, bridges, relining of failing structures, storage bins and silos, explosive magazines and other types of shelters, water tanks, reservoirs and pipe shells.

Further benefits are obvious where structures have to be built in locations where access is difficult. In addition, pre assembly of material can be undertaken where foundations are of concern, where water cannot be diverted or in weather conditions that would hamper other forms of construction.

Bevels, elbows, stubs, branches and other shapes increase the versatility of Armco Superlite's products.

END PROTECTION

Corrugated steel pipes have the advantage of being shaped to many different forms. This is particularly true of the ends of structures where bevel ends are cut to conform to the side slope of embankments, resulting in substantial savings in the design and construction of inlet and outlet end protection. This however does not mean that end protection may be omitted. Corrugated metal pipes require the same protection as any other drainage structure and care should be taken at the inlet and outlet ends.

Several methods of embankment slope protection can be recommended to prevent backfill material from eroding or washing away. Armco Superlite will be pleased to assist you in deciding the most suitable method for your application.

DIMENSIONS

All dimensions quoted are to the Neutral Axis. All areas are to the inside of the corrugation without manufacturing and assembly tolerances.

QUALITY

Armco Superlite are certified in accordance to ISO 9001:2015 Quality Management System. This internationally accepted listing ensures the quality of all products that leave our premises. Specific customer quality plans can be catered for in our manufacturing process.