

**TECHNICAL
BRIEF**

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**BARRIER QMB SYSTEM COMPONENT SERVICE LIFE
EXPECTANCY**

The service life of system components is defined as the time duration from fabrication to the point in time when the maintenance requirements exceed stated routine standards for the specific product or system and the failure to perform said maintenance would result in any of the following conditions:

- Structural safety is unacceptable due to material degradation or exceeding the design load-carrying capacity;
- Severe material degradation, such as corrosion of steel reinforcement initiated when diffusing chloride ions attain the threshold corrosion concentration at the reinforcement depth;
- Functional capacity of the structure is no longer sufficient for a demand, such as a football stadium with a deficient seating capacity.

QMB Barriers

With proper system maintenance and operation, QMB barriers have a service life expectancy in excess of 30 years, excluding impact-related damage. The service life assessment of the barrier considers both the concrete and steel material from which the barrier is comprised. As noted in TB 940816-Rev. 1 "All exterior components of an RTS system are hot dip galvanized except that the spring is powder coated and some components may be stainless steel which will not be finished."

Given the three types of exposed steel surfaces, the hinge springs (only items with a powder coating) can reasonably be replaced and are therefore categorized as routine maintenance. The foot bars are the only stainless steel item and would generally only be susceptible to degradation as a result of corrosion. The foot bars consist of 304(18-8) grade of stainless steel. Of the many types of corrosion which can degrade stainless steel the particular purpose the exposed foot bar serves and the type of environments into which the barrier would exist during its service life exclude it as the likely degradation mechanisms that would manifest in the component. The remaining surface is carbon steel which is coated (hot dip galvanized) in accordance with ASTM A123. Based on the least thickness of the hot dipped steel as prescribed by ASTM A123, the average time to maintenance, as a result of corrosion, would be in excess of 30 years (assuming an

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industrial environment which is conservative) per the American Galvanizers Association compilation of empirical data in addition with mathematical modeling.

The service life evaluation of the concrete portion of the barrier has been completed in conjunction with the guidelines established by ACI 365.1R-00. Meeting design objectives with respect to ensuring that the concrete structure has a service life which at a minimum exceeds that of the steel components includes defining several critical concrete parameters. These include items such as w/cm, admixtures, reinforcement protection and curing methods.

The selection of concrete materials and mixture proportions is usually based on empirical relationships between concrete mixtures and laboratory and field performance. Due to the fact that the fabrication of the concrete barrier is not localized and can change on a project to project basis, the uniformity of the materials included in the batching of the concrete is difficult to maintain. As such, our mix design is focused on maintaining a minimum cement content (ensures adequate w/cm ratio, and compressive strength), inclusion of an admixture to eliminate voids in the mold which results in consistent cover for reinforcement and local curing methods with proven track records in the local climate.

The field performance of the barrier demonstrates service life in excess of twenty years in coastal as well as other harsh environments with no evidence of reduced service life to date. These barriers continue to perform and are monitored intermittently for performance and service life criteria compliance. Currently, there are no indications which would result in a reduction of the 30 year service life for the barrier.

Machines

Machines that are properly maintained according to factory inspection and maintenance procedures and operated on properly maintained walls have a life expectancy of 20 years. This life cycle will include periodic change outs of components, including engines, pumps, etc., according to manufacturers recommended replacement schedules.

Variable Length Barriers (VLB's)

With proper system maintenance and operation, including, proper annual inspections and preventative maintenance, VLB's have a life expectancy of 20 years.

For proper maintenance procedures contact Barrier Systems, Inc., 180 River Road, Rio Vista, CA 94571, Phone: 707-374-6800, Fax: 707-374-6801