DELEGATES AT A RECENT seminar on corrosion were told that, to get the best return on investment, it’s important to identify potential problems before a new structure is built.

Raed El Sarraf of Opus International Consultants and Chair of the Australasian Corrosion Association Auckland Branch said that means asset owners should work with corrosion professionals from the earliest opportunity to ensure optimum performance from all materials throughout a structure’s design life.

El Sarraf was one of nine speakers at the Durability Planning technical seminar held by the Australasian Corrosion Association in Auckland.

From design to maintenance to refurbishment
One of the best options is to design problems away. ‘Minimise crevices, use drainholes and sloped surfaces to prevent water ponding and ensure regular inspection and maintenance are undertaken throughout the life of the structure,’ El Sarraf said.

A comprehensive durability plan should be developed covering every stage of an asset’s life cycle, from design through to construction, to operation and maintenance, and finally deconstruction or refurbishment.

To ensure materials will last in an acceptable condition throughout the life of the structure, ongoing maintenance is essential.

Devil in the detail
Stewart Hobbs of engineering and architectural practice Proconsult told delegates that it is important to consider detailing for durability as well. ‘If part of a structure can’t be rain washed to remove airborne pollutants, it must be washed by hand.’
And if drainage holes aren’t provided at complex angles, even rainwater can pond and potentially triple the rate of corrosion. The effectiveness of drainage systems is compromised if they become blocked for any reason.

Raed El Sarraf agrees. ‘Galvanic corrosion also needs to be considered. I always recommend that dissimilar metals be separated, for example, by using neoprene washers, wherever moisture bridging could occur.’

**Working to minimise risk**

By determining the net present value whole of life cycle costing for a range of corrosion protection systems, based on the materials used and the site’s corrosivity environment, the most appropriate system can be recommended. As part of the durability design process, a detailed specification and maintenance plan can be prepared.

However, if the specified corrosion protective system doesn’t suit the given environment, premature failure of the material may occur.

Raed El Sarraf frequently sees the result of incorrect detailing for durability during his inspections. Ring bark corrosion can occur on ground-planted light poles, where the application of an additional coating can help minimise corrosion at the base of the pole.

**Check for site-specific issues**

Unexpected corrosive challenges do occur, of course. Wildlife often appreciates a warm and sheltered spot in which to nest or roost. The result can be significant amounts of corrosive waste deposits that the structural element was never designed to withstand.

For new builds, it pays to first assess the site to determine its corrosivity environment. For example, is the structure exposed to seawater, salt spray or sheltered from rain washing? What is the function of the structure in relation to the surrounding environment? Do we need to consider atmospheric conditions only, or non-atmospheric conditions as well?

Relatively inexpensive soil and groundwater analyses can also be undertaken, and examining other structures in the area will give clues to the site’s exposure conditions and potential microclimates.

**Apply correctly and maintain**

The results of incorrect coatings or factory finishes being specified for materials and the environments they sit in are frequently seen. However, even the best systems won’t work if their corrosion protective system is not applied properly and regularly maintained. Careful inspections need to be carried out at all phases of its installation and the system’s performance carefully monitored over its design life.

The New Zealand Transport Agency, for example, expects new steel bridges to have a 40-year protective coating life before the first round of major maintenance of their protective coating systems.

To achieve this, applicators and inspectors are needed to ensure the coating system specification meets stringent durability requirements.

**For more** • Visit the Australasian Corrosion Association’s website at www.corrosion.com.au.