ABSTRACT

Corrosion Protection of Steel Structures In
Moderately Aggressive Environments
A Case Study

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This project report examines the causes of corrosion of steel in the moderately aggressive environment surrounding Caroni (1975) Limited's bulk sugar handling facility at Point Lisas, Trinidad.

The facility consists essentially of a bulk sugar storage warehouse, two molasses storage steel tanks and a structural steel, bulk sugar ship loading conveyor system.

Severe corrosion was found on many of the critical components of the facility and in the particular case of the ship loading tower, corrosive influences were traced to the presence of chloride ions and an alkaline environment created by the close proximity of the ammonia loading jetty owned by Hydro Agri.

To study the possible effects on structural integrity of the degree of corrosion observed, structural design checks were carried out on the molasses tanks and the ship loading tower. The results indicated that the actual tank shell thicknesses were below acceptable design standards, and the stability of the tower was

suspect under the influence of large-magnitude lateral wind and seismic forces.

The general conclusion was that the present state of the facility could be attributed to the neglect of timely maintenance activities allowing the corrosive elements to take their toll.

The general recommendations were that both molasses tanks required extensive rehabilitative work. Several alternatives were presented and it was suggested that an economic analysis be undertaken to determine the most suitable one. The ship loading tower needs to be more rigorously analysed for structural stability against lateral forces. An in-depth discussion of the causes of and protection against corrosion was also undertaken with a view to recommending appropriate protective coating systems and maintenance procedures.