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## Asset Management

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### 6.1 Introduction

The increase in the number of ageing infrastructures in Europe, North America, and Japan over the last three decades, has led to the development of a set of tools that allow a more consistent and optimized management procedure. Asset management can be defined as the systematic activities and practices used by an organization to manage its infrastructures, by optimizing performance, risk, and expenditures over the structure's entire life cycle. These tools and procedures are fundamental in reducing costs during the use of the structure, as well as in extending their service life, and minimizing decommissioning and replacement expenditures.

Although the methods and principles described in this chapter can be applied to any infrastructure, their emphasis is placed on large stocks, owned or managed by a single entity, either public or private. In fact, in this case, the potential benefits are larger and clearly justify the required investment. In this context, the most advanced civil asset management systems can be found associated with transportation networks, in particular, for bridges and pavements. Nevertheless, significant developments can also be found in other areas, including water and oil transportation systems, airport pavements, ports, and buildings among others.

The management of such stocks requires a clear definition of objectives, in terms of performance, risk, and costs, as well as a long-term strategy to achieve these objectives. An asset management system must be based on three fundamental modules: database, performance prediction models, and optimization. The first is an inventory of the infrastructure network and contains all relevant information regarding each infrastructure, including design information, past maintenance actions, and performance evaluations results. The second includes models for predicting future performance, considering the effects of deterioration, use, and maintenance actions.