5 Diesel and Electric Engines

5.1 Electric Railways Revolutionize Urban Transport

In January 1888, Richmond, Virginia served as a proving ground for electric railways as Frank Sprague built the first working electric streetcar system there. By the 1890s, electric power became practical and more widespread, allowing extensive underground railways. Large cities such as London, New York, and Paris built subway systems. When electric propulsion became practical, most street railways were electrified. These then became known as "streetcars," "trolleys," "trams" and "Straßenbahn." They can be found around the world.

In many countries, these electric street railways grew beyond the metropolitan areas to connect with other urban centres. In the USA, "electric interurban" railroad networks connected most urban areas in the states of Illinois, Indiana, Ohio, Pennsylvania and New York. In Southern California, the Pacific Electric Railway connected most cities in Los Angeles and Orange Counties, and the Inland Empire. There were similar systems in Europe. One of the more notable rail systems connected every town and city in Belgium. One of the more notable tramway systems in Asia is the Hong Kong Tramways, which started operation in 1904 and run exclusively on double-decker trams.

The remnants of these systems still exist, and in many places they have been modernized to become part of the urban "rapid transit" system in their respective areas. In the past thirty years increasing numbers of cities have restored electric rail service by building "light rail" systems to replace the tram system they removed during the mid-20th century.

5.2 Diesel Power

Diesel-electric locomotives could be described as electric locomotives with an on-board generator powered by a diesel engine. The first diesel locomotives were low-powered machines, diesel-mechanical types used in switching yards. Diesel and electric locomotives are cleaner, more efficient, and require less maintenance than steam locomotives. They also required less specialized skills in operation. After working through technical difficulties in the early 1900s, diesel locomotives became mainstream after World War II. By the 1970s, diesel and electric power had replaced steam power on most of the world's railroads.

K. Tzanakakis: *The Railway Track and Its Long Term Behaviour*, STTT 2, p. 17.
DOI: 10.1007/978-3-642-36051-0_5