# Abstract

การศึกษาโครงสร้างจุลภาคของรางรถไฟ

Microstructural Study of Rail

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Collaborative agency   State Railway of Thailand

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Rails are subjected to severe contact stress, frictional heat, and shear stress due to traction load. In addition to this, it also bears dynamic forces transmitted by the wheels rolling on it. All these loading conditions deteriorate the material condition of the contacting zone and favour rail degradation in terms of plastic deformation, wear, and rolling contact fatigue. It is important to use high-quality steel that is resistant to these damages. From time to time, railway rails need to be replaced. In that case, and when a new track is built, a decision has to be made about which rail grade is going to be installed. Due to the construction of many rail tracks in Thailand, many rails have to be imported. But the data from the SRT showed that some of the rail lots were prematurely broken. The mechanical properties of metals are often directly related to the chemical composition and microstructure. Therefore, if a microstructure is defined that is suitable for the operating conditions since the inspection procedure, then the rail will last as expected. The intention of this work was to compare different new rail steels in 9 locations that were installed in 2020 with regard to their suitability from a microstructural perspective. Microstructure characteristics of rail steels are determined by various microstructural features, such as grain size, phase fraction, as well as the spatial distribution and morphology of these phases in the microstructure. In order to

characterize the influence of microstructure on the mechanical behavior, various microscopy techniques, such as light optical microscopy (LOM) and scanning electron microscopy (SEM), were used.
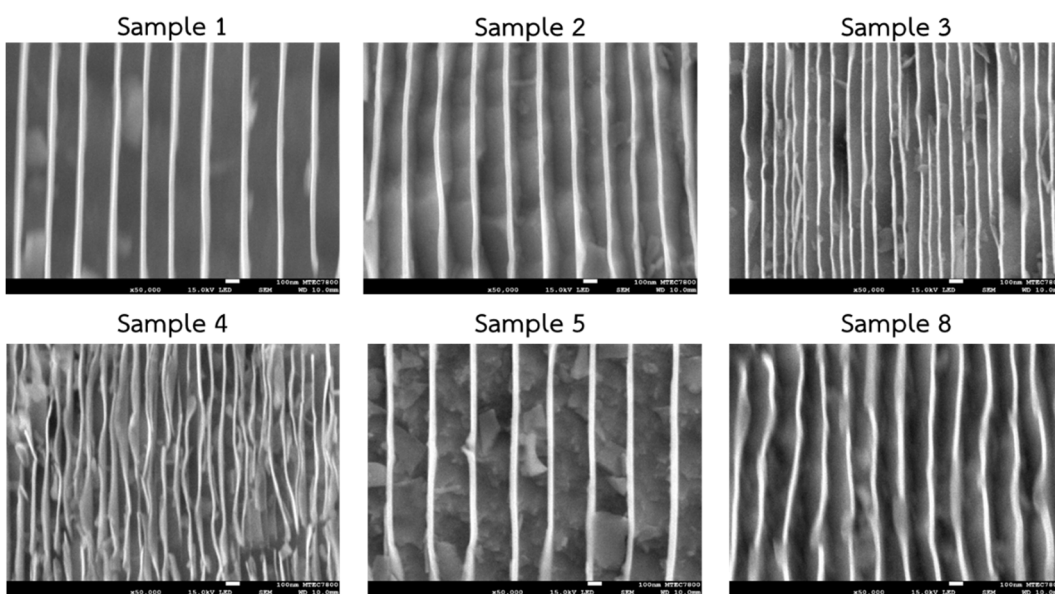
เปรียบเทียบลักษณะของ Lamellar spacing ที่กำลังขยาย 50,000 เท่า โดย SEM