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Development of Railway Track Geometry Indexes Based on Statistical Distribution of Geometry Data

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Source: JOURNAL OF TRANSPORTATION ENGINEERING-ASCE **Volume:** ۱۳۶ **Issue:** ۸ **Pages:** ۶۹۳-۷۰۰ **DOI:** ۱۰.۱۰۶۱/(ASCE)۰۷۳۳-۹۴۷X(۲۰۱۰)۱۳۶:۸(۶۹۳) **Published:** AUG ۲۰۱۰

Times Cited: ۰ (from Web of Science)

Cited References: ۱۰ [[view related records](#)] [Citation Map](#)

Abstract: In this paper, the statistical distribution of railway track geometry data is investigated using a significant volume of field data. Analyzing the results yields a general pattern for the statistical distribution of the track geometry data. This is used to develop new indexes for track geometry parameters including gauge, profile, alignment, and twist. An overall track geometry index is established by combining the new parameter's indexes. This combination is made by assigning a coefficient to each geometry parameter based on its role in the overall quality condition of the track. In comparison with the approaches previously used for the development of the track geometry indexes, this method has three distinguishing features. First, the mean values along with the SD of data are incorporated into the calculation of the new indexes. Second, the new indexes indicate not only the condition of the individual parameters but also the overall track geometry condition. Third, the track classification is considered, and an index is developed for each class of the tracks. A practical use of the new indexes is presented and discussed in the paper.

Document Type: Article

Language: English

Author Keywords: Geometry index; Twist; Profile; Alignment; Gauge; Standard deviation; Mean

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Publisher: ASCE-AMER SOC CIVIL ENGINEERS, ۱۸۰۱ ALEXANDER BELL DR, RESTON, VA ۲۰۱۹۱ ۴۴۰۰ USA

Web of Science Category: Engineering, Civil; Transportation Science & Technology

Subject Category: Engineering; Transportation

IDS Number: ۶۲۶XG

ISSN: ۰۷۳۳-۹۴۷X