شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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Ain Shams University
Faculty of Engineering
Public Works Department

RAILWAY TRANSPORTATION ANALYSIS IN EGYPT

By
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M. Sc. Civil Engineering
Ain Shams University, 1992

A Thesis Submitted to the Department of Public Works, Faculty of Engineering, Ain Shams University

For The Degree of Doctor of Philosophy in Civil Engineering (Railway Transportation Planning)

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RAILWAY FREIGHT TRANSPORTATION PLANNING IN EGYPT

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STATEMENT

The dissertation is submitted to Ain Shams University for the degree of Doctor of Philosophy in Civil Engineering

The work included in this thesis was carried out by the author in the Department of Public Works, Faculty of Engineering, Ain Shams University, from October 1994 to Jan 2001.

No part of this thesis has been submitted for a degree of qualification in any other University Institution.

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Abstract

Railroads have been faced with fierce competition and decreasing market shares in the field of freight transportation. In Egypt, most of the transportation have concentrated on passenger movement so far Egypt National Transportation Studies (ENTS) which considered as the main transportation studies in Egypt, did not develop any models for the freight transportation. So, this shows the great need for the development of some mathematical models representing the movements of goods within the different areas especially by rail mode of transport. These models will help the decision- makers in the planning process to positively affect this vital infrastructure and helps it to get rid of all the losses it faces nowadays.

The main objective of this thesis is to develop railway transportation models for freight movement prediction and to compare the different modelling approaches. To achieve this objective, the different modelling approaches were reviewed. Twelve strategic commodities that represent about 97% of the total transported freight by rail in 1995 as the base year were chosen for this research. The modelling process was done on the level of each commodity using both the sequential and simultaneous modeling approaches. The linear regression analysis and peicewise techniques were used to calibrate the freight generation models. The independent variables used in model calibration were population, investments, gross regional domestic products and employment by sector. The freight distribution models were calibrated in the form of doubly constrained gravity models. The freight generation and distribution models are then calibrated simultaneously. Comparison between the two modelling approaches

show that the sequential approach is better than simultaneous approach in the field of railway freight modeling in Egypt. These models were then used to predict the railway freight movement in the target year 2012. Assignment of the predicted flows on the railway network and comparison of these flows with the railway links capacity was done. Values of (v/c) ratio for different line classes were 0.96, 0.79 and 0.64 with average ratio 0.87. It is also shown that about 44% of these links can be considered as congested links. Some improvements for the railway network were suggested to accommodate the transportation demand. Application of these improvements shows a decrease in (v/c) ration from 0.87 to 0.67 with percentage of decrease equal to 0.23.