



Date: 12/03/2024

Acceptance Letter

Dear

José Luis Rodríguez-Álvarez
Jorge Luis García Alcaraz
Cayetano Navarrete-Molina
Arturo Soto-Cabral

I am pleased to inform you that the chapter “*Root Cause Analysis (RCA)*” has been **ACCEPTED** for publication in the book “*Lean Manufacturing in Latin America - Concepts, Methodologies, and Applications.*” Please make a final review of your chapter regarding structure, format, and citation style.

We thank you for your effort and trust in this initiative to document the impact of Lean Manufacturing in Latin America. Please emphasize the technical approach in your chapter. We strongly recommend the use of original graphic content. Otherwise, it is necessary to obtain permission for non-original material (text, tables, or illustrations that you have incorporated in your manuscript from other sources or previous publications).

Sincerely,

Dr. Guillermo Cortés Robles
Instituto Tecnológico de Orizaba
Mail: guillermo.cr@orizaba.tecnm.mx
Phone: +52 272 725 7056
Orcid: <https://orcid.org/0000-0001-8857-7143>



Jorge Luis García Alcaraz
Guillermo Cortés Robles
Arturo Realyvásquez Vargas *Editors*

Lean Manufacturing in Latin America

Concepts, Methodologies and
Applications

Lean Manufacturing in Latin America


Jorge Luis García Alcaraz ·
Guillermo Cortés Robles ·
Arturo Realyvásquez Vargas
Editors

Lean Manufacturing in Latin America


Concepts, Methodologies and Applications

 Springer

Editors

Jorge Luis García Alcaraz 
Department of Industrial Engineering
and Manufacturing
Universidad Autónoma de Ciudad Juárez
Ciudad Juárez, Chihuahua, Mexico

Guillermo Cortés Robles 
Tecnológico Nacional de México
Veracruz, Mexico

Arturo Realyvásquez Vargas 
Department of Industrial Engineering
Tecnológico Nacional de México/Institu
Tijuana, Baja California, Mexico

ISBN 978-3-031-70983-8 ISBN 978-3-031-70984-5 (eBook)
<https://doi.org/10.1007/978-3-031-70984-5>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2025

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

If disposing of this product, please recycle the paper.

Chapter 19

Root Cause Analysis (RCA)



José L. Rodríguez-Álvarez , Jorge Luis García Alcaraz ,
Cayetano Navarrete-Molina , and Arturo Soto-Cabral

Abstract This chapter delves into the RCA manufacturing tool, examining its development and significance and the benefits it offers when properly implemented. In addition, it explores the critical success factors for adoption and recommendations for implementation. Moreover, a bibliometric review was conducted to analyze the RCA-based problem-solving approach in the industry, identifying the authors, institutions, and countries that have contributed the most scientific papers and those that have been most cited. Lastly, an applied case study is presented, demonstrating the step-by-step implementation of an RCA based on the 8D's methodology to resolve a quality issue detected by a customer in a corrugated cardboard box. Using One-Way ANOVA, the cause of the problem was initially validated. The effect was then quantified, enabling the customer to identify the critical quality variable that needs to be maintained. It is important to note that RCAs do not necessarily require substantial investment to eliminate the root cause of a problem. Instead, the use of statistical tools and methodologies, whether classical or based on artificial intelligence and big data, can provide a cost-effective solution.

Keywords Root cause analysis · Problem-solving · 8D's · Corrugated process · Cardboard warp sheet

J. L. Rodríguez-Álvarez (✉)
Department of Management Engineering, TecNM/Región de Los Llanos, Guadalupe Victoria,
34700 Durango, Mexico
e-mail: luis.rodriguez@itsrll.edu.mx

J. L. García Alcaraz
Department of Industrial and Manufacturing Engineering, Autonomous University of Ciudad
Juarez, 32310 Juarez, Mexico
e-mail: jorge.garcia@uacj.mx

C. Navarrete-Molina
Department of Chemical Area Environmental Technology, Technological University of Rodeo,
35760 Durango, Mexico

A. Soto-Cabral
Department of Industrial Engineering, TecNM/IT Durango, 34000 Durango, Mexico
e-mail: soto.cabral@itdurango.mx