

QUALITY MANAGEMENT AND COORDINATION MODEL FOR THE CIVIL CONSTRUCTION SUPPLY CHAIN FOCUSED ON BRAZILIAN CERAMIC TILE MANUFACTURERS

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1. INTRODUCTION

Studies that associate quality management (QM) with supply chain management (SCM) seek integration between the elements common to both types of management for chain members to achieve competitive advantage. This model is known as supply chain quality management (SCQM).

Quality coordination in supply chains is a set of activities planned and controlled by a coordinating agent with the aim of improving product quality and customer

satisfaction, reducing costs and losses in the chain stages and improving chain competitiveness through information transaction process and improved chain quality management. (TOLEDO et al, 2003)

This paper describes the quality management model in the civil construction supply chain, specifically the link involving ceramic tile manufacturers and the role of the Ceramic Center of Brazil (CCB) as a construction supply chain quality coordination agent civil. Brazil is one of the world's leading players in the ceramic tile sector, ranking third in production and consumption.

2. MATERIALS AND METHODS

The quality management and coordination model used as a theoretical framework was based on previously published works on quality management in the production chain. Secondary data were obtained from the corporate audit reports by the CCB and sectoral reports prepared by the sector agents: The Brazilian Association of Manufacturers of Ceramic Tiles, Sanitary Ware and Related Products (ANFACER), The Brazilian Quality and Productivity Habitat Program (PBQP-H) and The Construction Union (SINDUSCON).

3. RESULTS AND DISCUSSION

The following are the quality management and coordination modules in the Brazilian ceramic tile sector:

Module I: Quality Strategy

- a) Identifying market and regulatory requirements: The parameters guiding the quality strategy for the chain were identified and analyzed: i) Legal Requirements, Consumer Requirements, Chain Requirements/ Company and Society Requirements.
- b) Defining the quality strategy and quality characteristics to be coordinated: The quality strategy adopts the Product certification scheme. The identification of the products and the company are made through the Conformity Label on the packaging and made available by the National Institute of Metrology, Standardization and Industrial Quality (Inmetro).

Module II: Quality Planning

- a) Product Quality Characteristics (PQC): defined by points of sale (technical and packaging), producers (raw materials, decoration, finished product).
- b) Quality Management Practices (QMP): suppliers (batch inspection), manufacturers (ISO 9001 management, traceability) and points of sale (stocks).
- c) The Coordination Practices (CP) by the CCB: technical assistance, services rendered, coordination of technical commissions for drafting product standards and product and quality management system certification. CCB's role in Quality Coordination is centered on the ceramic tile production agent. The product certification mechanism enables management practices to be assessed between these three agents: critical first-tier suppliers, ceramic tile manufacturers and customers (building supply stores and construction companies).

- d) Chain Quality Performance Indicators (ID): 93% of Brazilian ceramic tile production is certified with 95.1% of compliant products in the first half of 2019.
- e) Generating a plan for the implementation of actions / changes: The action plan was to combine Product Certification with the PBQP-H Sector Quality Program (PSQ). This way there was no cost increase in the chain and quality coordination can be implemented. As a PSQ Technical Managing Entity, CCB discloses the list of companies that comply with the standards and non-compliant or non-qualified companies on a quarterly basis. Compliant and non-compliant products are disclosed by the Ministry of Cities (http://pbqp-h.cidades.gov.br/project_simac_psq2.php?id_psq=58) in periodic reports and companies are prohibited from negotiating with works using resources from federal government funding.

Module III: Quality Control

The PSQ Program and Product Certification evaluate 53 companies, 83 brands in a total of 67.8 million m² / month produced. Approximately 310 lots are evaluated in the quarter and 3,410 tests are performed. For Quality Management Practices, nonconformities identified during the audit should have proposed corrective actions and evidence of implementation of these actions within pre-established deadlines. Product samples are taken from company stock or retail: one sample every 250,000 m² production / month.

Module IV: Quality Improvement

Due to the high compliance rate for this type of production chain, efforts to increase compliance can lead to costs that do not justify improvement. Thus, improvement practices do not only encompass the product chain - ceramic tile, but the constructive system with the other agents of the downstream chain.

4. CONCLUSION

The analysis of the four modules and the activities indicated that the systematic developed in the tile chain corroborates the theoretical model, but some contributions can be made to the model. The Ceramic Center of Brazil (CCB) has been acting as a coordinating agent in the ceramic tile production chain due to its activities as the main Product Certification Body of the chain in Brazil. Its activities are linked to the management of the information system, communication of problems and opportunities for improvement, coordinator of the standards review committees that allows periodic meetings with the ceramic tile manufacturing agents and acting as a Sector Technical Entity that quarterly evaluates the product compliance.

The high representativeness of the compliance index (95.1%) and the participation of ceramic tile manufacturing companies (93.0%) is also due to government actions such as the PBQP-H / PSQ Program, the recognition by customers and consumers of the Inmetro Label of Conformity and the support of the main manufacturers associations - ANFACER and ASPACER.

The assessment of the chain compliance index was limited to the ceramic tile manufacturer and should be extended to the other chain agents: suppliers and customers. There are customer satisfaction indicators obtained by manufacturers and these should be incorporated into quality coordination.

5. REFERENCES

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