

Belt Conveyors for Bulk Materials



PREPARED BY THE ENGINEERING CONFERENCE
With Metric Conversion

The Voice of the Conveyor Industry of the Americas

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SEVENTH EDITION

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PREFACE

The goal of this book is to be the definitive resource for experienced conveyor engineers on the design, installation, operation, safety, and maintenance of belt conveyors for bulk materials. The methods detailed in this book can greatly assist experienced conveyor engineers in designing efficient and reliable bulk material conveyor systems with a level of quality that reflects a systems approach to design and operation, and meet the user's expectations.

Experienced conveyor engineers can use the information and engineering principals set forth herein to design virtually any width, length, configuration and capacity of bulk materials handling belt conveyor systems, and predict its performance within an acceptable range. Interested parties can also gain a basic understanding of the engineering, component selection, related equipment and accessories, and applications for belt conveyors.

The information presented in this book is intended to cover the basic principles of belt conveyor design and to include such formulas, tables, charts and recommendations as are required to design most belt conveyors. The material is arranged in the order most convenient for the use by an experienced conveyor engineer. As always, the responsibility for the ultimate safety, reliability, and functionality of any conveyor system rests with those who design and build it.

While the formulas, recommendations and data are based on industry practice and are believed to be reliable, CEMA does not, and can not, assume any role in, or responsibility for, the safety, reliability or functionality of any conveyor system or component which it did not design. The formulas and principles in this book are guidelines only and are applicable to the design of a high percentage of conveyors that are operated under reasonably normal conditions. However, conveyor design is as much an art as it is science, and some conveyors will operate under conditions that are beyond the scope of this book. These design challenges require broad experience for a satisfactory solution. A qualified and licensed designer or engineer from a CEMA member company should be consulted in such cases, as well as in the design of conveyors that are critical to a process, are very wide or fast conveyors, and complex conveyor systems.

The units of force are expressed as lbf (kgf). If a clear distinction is appropriate between force and mass, the mass units will be expressed as lbm (kgm). In cases where necessary or customary Newtons (N) are used for force. Bulk material unit weight is referenced as bulk density throughout this text though the intent in engineering calculations is usually to use the specific weight. Therefore the symbol γ_m for the weight per unit volume is used rather than the typical symbol ρ for mass per unit volume.

Equations are formatted, whenever possible, in fundamental engineering terms. This approach accommodates user preferences for units. Examples use dimensional values but rounding of input variable values can create slight differences in the results between what is shown in the text and those obtained by manual working of the examples. Final flight tension values are typically rounded to whole numbers. Rounding conventions may vary between different chapters due to the common practices of different component groups.

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