

MECHATRONICS BOOK SERIES SYSTEM DESIGN AND SIGNAL PROCESSING VOLUME 1

Editors

**Asan G. A. Muthalif
Amir Akramin Shafie
Siti Fauziah Toha
Iskandar Al-Thani Mahmood**



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CHAPTER 2

Design and Development of Automatic Paper Box Folding Machine

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2.1 Introduction:

Automatic paper box folding machine is very much related to industrial automation. Using the historical way, the box folding and gluing part will be conducted by the laborer. The drawback of this is that, system slows down the production and human workers tend to make mistake in the activity they conduct. Nowadays many industrial machines for folding the box have been developed and been used for mass production. This project has been planned to redesign the available system into simplest system. The advantage of this new system is that it reduces the inventory level and user friendly machine. The whole process of design, construction and control of the machine has been discussed further in this chapter. There are many projects that are related to this topic which we found in many sources. Regrettably, all the available machines are the industrial automation and manufacturing purposes. Our project is focus more on the simple machine that can fold and glue the box.

Folding machines is exclusively used for folding paper (commonly referred to as paper folders). These machines are typically used for creating letter folds (C Folds) and accordion folds (Z Folds). Other universally used folds include a half fold, fold-out, double parallel fold, gate (brochure) fold, and right angle fold.

The fold type is set up by adjusting two folding plates. As paper enters the machine, it hits the first plate, is run through rollers that fold the paper and hits a second plate, after which the final crease is made. Most paper folders allow for a wide range of fold types. Right angle folds require the paper to rotate 90 degrees. Many machines require manual re-feeding after the first fold to accomplish this.

Entry level paper folders require that the folding plates be adjusted manually, with fold settings specified on the folding plates. Higher-end paper folders will electronically adjust the folding plates for added precision and convenience. Both usually have fine tuning knobs for precise adjustments.

Most paper folders pull paper into the machine by use of a friction wheel. This wheel grabs paper by use of friction. Friction-feed paper folders do not work well with glossy paper as the friction wheel slips on the paper's surface. Pneumatic paper folders are ideal for folding glossy paper [1].

Where else, pneumatic paper folders pull paper into the machine by use of a vacuum. These folders are often referred to as air-powered paper folders. This makes it possible for the paper folder to be used with glossy or shiny paper. Most pneumatic paper folders include a built-in compressor. These folders still use two folding plates. The plates are adjusted manually or electronically, depending on the machine.

2.1.1 Automatic Four-Sides Folding Machine. This machine has a function of automatic four sides folding machine which originated from Zhejiang, China. It is used for packaging stuffs like wooden case. The sequence or functionality is firstly the contra-positioned glued face paper and under-packing paper are sent into folding machine by conveyor belt. Folding is finished automatically in one time by firstly folding left and right edge and secondly front and back.