



SILO OPERATOR'S MANUAL

A Guide For Greater Economy in Crop Processing and Storage
PREPARED BY INTERNATIONAL SILO ASSOCIATION

Safety • Feeds & Feeding • Types Of Silage
The Silage Process • Silo Management
Silo Equipment • Preventative Silo Maintenance



Operator's Manual

A Guide For Greater Economy in Crop Processing and Storage



January 2012 Edition
Prepared by International Silo Association, Inc.

This manual belongs to:

The material and information contained in this manual is general in nature; it has been gathered from universities and qualified individuals and is therefore, deemed reliable. This material is not guaranteed and is not necessarily a complete statement of all the available data. Conclusions are based solely upon our best judgement and analysis of technical factors and individual information sources. The use of the information contained in this manual in a particular farming operation requires the advice of qualified experts, your particular silo and equipment manufacturer, and is subject to limitations of good management, weather and other conditions present at the individual location.

Association Objectives

The objectives of the International Silo Association include:

- the involvement in production, distribution, building and financial functions of the silo industry.
- industry conduct for greatest economy and efficiency.
- cooperation with other industries and organizations.
- all crop process containers and storage structures.
- the advancement of education and research, the promotion and the dissemination of information of and about the preserving and the processing of more quality ensilage, and consideration of common intra-industry problems of management and other objectives which are recognized as proper and lawful activities of trade associations.

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CAUTION

1. Do not start to ensile crops above 65% moisture, or 55% moisture for silos taller than 80 ft. Seepage, and damage to silo and equipment may result.
2. Use extreme care in climbing your silo. Prevent children from climbing it. Heights are dangerous. Use caution. Beware of slippery conditions on the steps caused by moisture, ice, mud, manure, grease, feed, or other material.
3. Inspect silo at least once a year and practice silo and equipment maintenance regularly.
4. Repairing and/or servicing of this equipment should be performed by trained personnel only! Be absolutely sure power source has been disconnected—and cannot be turned on—when performing routine maintenance or inspecting this equipment.
5. In climbing the chute door steps when a silo is empty, all doors, steps, door jambs and fastening hardware must be clean and in good condition. All doors must be locked securely in place.
6. Stored materials with a moisture content of 30–40% may be subject to spontaneous combustion.

IMPORTANT **ONGOING PREVENTATIVE MAINTENANCE**

Regular and careful inspection of your silo is extremely important to detect deterioration

- Inspect the lower portion of cast-in-place and stave concrete silos for signs of deterioration
- Inspect the rods, channels, angles and connections within the chute of stave concrete silos
- In older cast-in-place concrete silos, carefully inspect rebar that spans the open door column for deterioration

If any deterioration is detected, contact a silo professional

IMPORTANT

PREVENT THE RISK OF SILO FAILURE AND POSSIBLE COLLAPSE BY:

- Inspect your silo regularly to detect and repair any deterioration of concrete or reinforcing steel—this is particularly true with the increased corrosion risk of high moisture forages
- Insure that your silo is adequately reinforced and structurally sound for fast filling operations that create increased downward and outward wall pressure
- Avoid seepage or drainage that could result in uneven settling of the silo foundation
- Insure that any additions to a silo's height also include increased lower reinforcement
- Do not fill a silo with free-flowing material if it has not been designed to handle the additional wall forces of this material
- Avoid off-center loading and uneven distribution, particularly of free-flowing materials

Introduction



So, you've got a new silo! You're proud of your new structure, and so you should be! That big, beautiful tower structure is visible for miles, and it marks you as a smart operator.

You'll get more nutrient value from your crops such as corn or grass, with less physical labor, and at less cost than with any other method of crop handling and preservation. Chances are good that you'll make this the start of a complete mechanical (even automated) feeding system. If so, you'll save countless hours of labor, and produce even more. This all boils down to profit!

Proper management of your silo and related equipment is very important. That's why your silo manufacturer, a member of this association, has provided you with this manual. Read it often. Let your source of pride become a potent source of profit!

Your Silo Operator's Manual

This manual has been created with the view that although farming today has become highly mechanized, you, as the farm operator, are the key to success. Even in this growing era of computerization, it is still the "man" in management that counts; there are important things which you can and must do to make modern tools such as your tower silo work for you to the greatest advantage.

Section 1. Introduction

This section is an introduction to the Silo Operator's Manual. It outlines the philosophy behind the development of the manual; it comments on the material to be found in each of the

following sections; it contains a glossary of terms and shortforms used throughout the manual.

Section 2. Safety First—Let's Prevent Accidents

By far the most important part of silo management is understanding the hazards that exist around farm silos, adopting a mental attitude of "safety first," and then putting into effect a program of inspection, repair, education and accident prevention on a continuing basis. Everything that is possible and practical must be done to prevent accidents. All the advantages of owning a tower silo will be of little value if you, or any of your workers, family, or friends are hurt or killed. Play it safe—observe good safety practices.

Section 3. Feeds And Feeding

One of the first decisions to be made in the use of the silo is the type of crop to be harvested and ensiled. This is not a simple decision; it involves consideration of a) crop production factors such as climate, soil type, topography, drainage and fertility level, and b) livestock production factors such as type of animal, feed requirements (amount, type and form of feed, etc.) and market objectives. Most of the feed requirements can be supplied in the ensiled form—the question is which ones are best suited to your particular farming situation.

Section 4. Types Of Silages

Most of the major crops grown for livestock feeds can be stored to advantage in the ensiled form. Each has characteristics that are unique, and should

be considered in choosing the cropping and feeding program for a particular farm situation. This section discusses a wide range of these crops (haycrop, corn, cereals, sorghum, etc.).

Section 5. The Silage Making Process

Equally important as the structure in which you store your silage is the management practices you follow in operating your silage system. In fact, some authorities take the position that in the end, management is more important than type of storage structure—the key to success in silage preservation and feeding is what you do with what you've got. You've got great potential in your tower silo and related equipment—make sure you get the most in benefits by following good management practices.

The first aspect of good silo management is understanding what goes on inside your silo when you put in a crop. Even today, after all the years that farmers have been making silage, there are still many who do not understand the ensiling process and the various factors that influence the results—the quantity and quality of feed taken out of the silo.

Section 6. Silo Management

Once you understand the fundamental principles involved in silage making, you are well along in understanding the basics of good silo management. Based on these principles, there are a number of procedures which you should follow in relating silo size to herd size, and in the seasonal routine of harvesting, filling and unloading. There are a series of management practices which, when put together, give a recipe for successful silo management which can be applied, with certain modifications, on any farm, with any crop, and using any type of storage structure.

Section 7. Silo Equipment

The satisfaction you receive from your tower silo will only be as good as the operation of the associated equipment (moisture tester, forage blower, silage distributor, and silo unloader), which together make up an efficient silage storage and

handling system. The selection, operation, safety and maintenance of these vital pieces of equipment are discussed in this section.

Section 8. Preventative Silo Maintenance

Tower silos, at first sight, appear to be virtually indestructible. These silos will last for a long time (a farmer's working life-time or more) if they are properly maintained. To get long life, with maximum operating satisfaction, you need to start on a program of preventative maintenance, beginning the first year of operation. The details on inspection, repair, coatings, etc. are discussed in this section. In addition, regular inspection and maintenance of such things as doors, ladders, chutes, unloader lifting mechanisms, etc. are highly important, and are dealt with in this section as well.

As outlined, this manual attempts to give you in one source, a lot of information which we believe will be useful in operating your tower silo to give you, the farmer, the full potential in time and labor saving, quality feed, and maximum profit.

This manual, however, is not presented as a substitute for the manuals which you should receive for each of the various pieces of associated equipment (e.g. silage distributor, silo unloader, silage feeding equipment, etc.). For specific information these are still your best sources.

The Name Of The Game Is Profit

One of the big advantages of the tower silo is the ability to fit this type of structure into a fully mechanized system of storage, handling and feeding. In fact, much of the system can be automated if desired. This, however, does not negate the fact that, although you, the farmer, have been relieved of much that is physical, still you must be active mentally—thinking, planning, scheduling, measuring and double-checking.

In farming it is often prudent to consider a "balanced system" of machinery, storage, herd size, waste removal, purchased inputs, custom service, etc. It also calls for head work in planning ahead, and "computer work" (pencil work) in balancing things and keeping records.