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Manure Storages

American Society of Agricultural and Biological Engineers

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Manure Storages

Developed by the Engineering Practices Subcommittee of the ASAE Agricultural Sanitation and Waste Management Committee; approved by ASAE Structures and Environment Division Standards Committee; adopted by ASAE March 1978; reconfirmed December 1982, December 1983; removed reference to ASAE S288 and reconfirmed December 1984; reconfirmed December 1985, December 1986; revised March 1988; revised editorially February 1989; revised October 1991; reaffirmed December 1996, December 1997; revised December 1998; reaffirmed February 2004, February 2009; November 2013.

Keywords: Manure, Storages, Waste

1 Purpose and Scope

1.1 This Engineering Practice provides recommendations for siting, design, and construction of manure storage units. Its recommendations are for both earthen and fabricated structures.

1.2 This Engineering Practice does not include recommendations for anaerobic treatment of livestock waste. See ASAE EP403 for this purpose.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Engineering Practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Engineering Practice are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Standards organizations maintain registers of current valid standards.

ACI S318-95, Building Code Requirements for Reinforced Concrete

AISC S326, Specifications for the Design of Cold Formed Steel Structural Buildings

AISIS SG-971 (1997), Specifications for the Design of Cold Formed Steel Structural Members

ASAE EP250.2 DEC98, Specifications for Farm Fence Construction

ASAE EP288.5 DEC98, Agricultural Building Snow and Wind Loads

ASAE S292.5 OCT94, Uniform Terminology for Rural Waste Management

ASAE EP378 DEC98, Floor and Suspended Loads on Agricultural Structures Due to Use

ASAE EP379.2 NOV97, Control of Manure Odors

ASAE D384.1 DEC98, Manure Production and Characteristics

ASAE S466.1 DEC98, Nomenclature/Terminology for Livestock Manure Handling Equipment

ASAE EP470 DEC97, Manure Storage Safety

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3 Definitions

3.1 Manure storages are for the accumulation of manure, wastewater, and runoff for the period of time required to allow for the accumulation's environmentally safe disposition.

3.2 Distinction between types of manure storages is usually by the consistency of the manure stored and/or the type of construction. For the purpose of this Engineering Practice, manure storages made by constructing an excavated pit, dam, embankment, dike, levee, or a combination of these procedures will be referred to as *holding ponds*. Fabricated structures for storage of liquids and slurries will be referred to as *tanks*, and those for storage of solid manure will be referred to as *dry stacking facilities*. Refer to ASAE S292 and ASAE S466 for terminology.

4 Laws and Regulations

4.1 All federal, state, and local laws, rules, and regulations governing the use of manure storages shall be followed. Included are those pertaining to local zoning, flood plain management, shoreland protection, and buildings. Necessary approvals and permits for location, design, construction, and operation shall be secured.

5 Design Criteria

5.1 General criteria

5.1.1 The need for manure storage should be based on the level of management, labor availability, nutrient conservation, timeliness of application to crop needs, and environmental considerations.

5.1.2 Required storage volume. The general equation for the required storage volume (see Figure 1) is as follows:

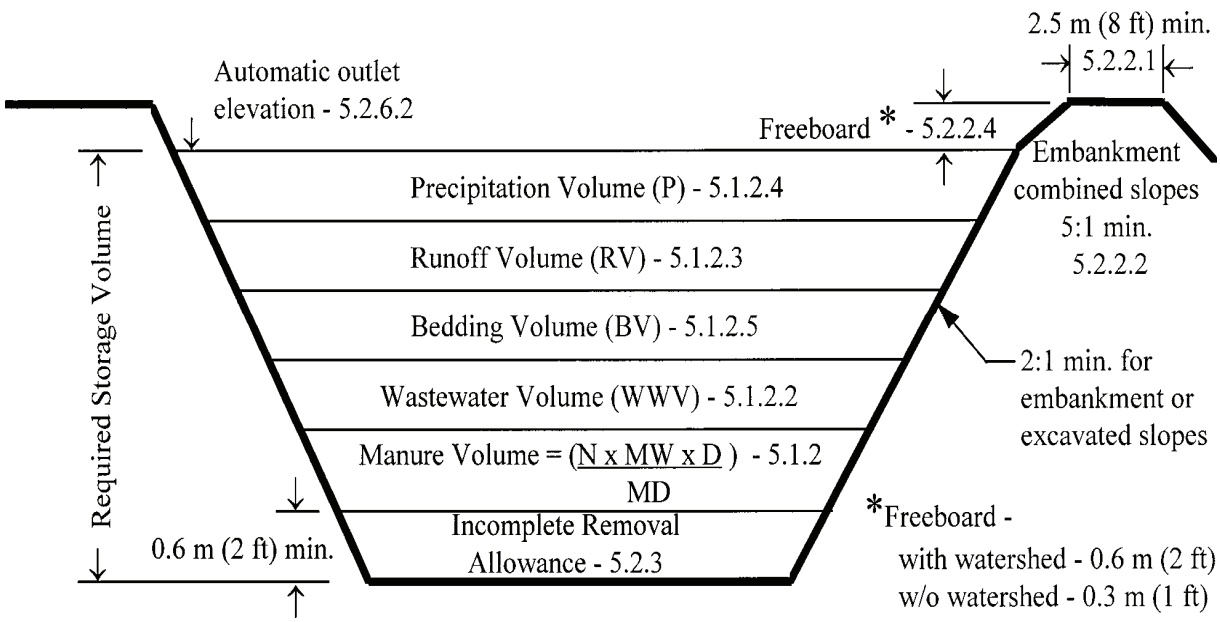

Figure 1 — Holding pond detail

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