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Costs of Storing and Handling Grain in Commercial Elevators, 1964-65

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Washington, D.C. April 1966

COSTS OF STORING AND HANDLING GRAIN IN COMMERCIAL ELEVATORS, 1964-65

Highlights

This report covers the cost of handling and storing grain at commercial elevators in the United States during fiscal 1964-65. The results were based on accounting records of 252 elevators selected to represent the principal storage areas, types, and kinds of construction (table 1). The sample included 165 country elevators, 58 inland terminal elevators, and 29 port facilities.

The total cost of reporting firms was allocated to receiving, shipping, and storage functions by areas, types of facilities, and alternative transportation methods (table 2). Four types of costs are shown: (1) Out-of-pocket costs, which contain no allowance for interest on investment or depreciation; (2) total cost, which includes the firm's own figures for depreciation and interest on investment; (3) short-term competitive rates reflecting the out-of-pocket cost of the marginal firms; and (4) long-term competitive rates based on total costs including depreciation and interest on replacement values.

Data relating to storage requirements and availability, cost data reflecting standardized depreciation and interest, and detailed composition of cost data developed from records of reporting firms also are presented (tables 3-20). Detailed information on sampling, methods of cost allocation, replacement value estimates, secondary data sources, and definitions are given in the appendix.

Country elevator records showed that book costs for the United States for storing and handling grain by the most common method averaged 10.4 cents per bushel. This cost included 1 year's storage plus receiving by truck and shipping by rail. It ranged from an average of 9.2 cents in the South and East to 12.0 cents in the Great Lakes area. The short-run competitive rate for the combined storage and handling functions was 8.0 cents per bushel. Long-run competitive rates averaged 13.5 cents per bushel. These long-run rates would provide for replacement and a 6-percent return on investment for houses with space necessary to store 1966 volumes when utilized at 75 percent of capacity.

At inland terminals, the combined book cost for receiving and shipping by rail, plus 1 year's storage, averaged 9.0 cents per bushel for the United States. Comparable averages for the major areas ranged from 8.0 cents per bushel in the Great Lakes area to 11.6 cents in the West. The short-run competitive rate for the combined storage and handling functions for inland terminals of the United States was 7.0 cents per bushel. Long-run competitive rates averaged 12.0 cents per bushel.

For all port terminals, the combined book cost for receiving by rail, storing for 1 year, and shipping by water averaged 9.3 cents per bushel. The indicated short-run competitive rate for all port facilities was 7.0 cents per bushel. Long-run competitive rates averaged 13.5 cents per bushel at ports.

For the United States as a whole, storage costs alone (as shown on the warehouse records), including recorded depreciation and interest actually paid out, averaged 5.4, 5.5, and 7.2 cents per bushel at country plants, inland terminals, and port terminals, respectively (table 2). Averages ranged from 3.8 cents per bushel at inland terminal facilities in the North Plains to 8.3 cents at port terminals in the West. The average cost per bushel for all plants, based on standardized depreciation and interest on investment, was only about 0.8 cent above book cost (table 10). This increase was due almost entirely to the inclusion of interest on investment for firms with no debt, or to cases where use of company money resulted in no interest being reported. The average cost per bushel for storage based on replacement ranged from 4.9 cents at South Plains country facilities to 13.6 cents at inland facilities in the South and East--an increase over book cost of 0.4 cent in the South Plains and 7.2 cents in the South and East area. The higher costs noted in the South and East reflect the existence of older, less efficient plants in the area. The negligible increase noted in the South Plains reflects the large, flat facilities built in recent years at relatively low construction costs.

Average out-of-pocket storage costs varied from 2.0 cents at port terminals in the West to 4.6 cents per bushel at inland terminal facilities in the South and East. But for the United States as a whole, out-of-pocket costs averaged only 2.7, 2.6, and 2.7 cents per bushel at country facilities, inland terminals, and port terminals, respectively.

For all plants combined, the average cost for receiving grain by truck was 1.4 cents per bushel (table 11). This compared with average costs of 2.1 cents at country facilities and 1.1 cents at inland and port terminals. Costs based on standardization of depreciation and inclusion of interest on investment remained the same. Cost estimates based on replacement averaged 0.2 cent per bushel higher than book cost.

Costs for all plants for receiving by rail were only slightly higher (averaging 1.5 cents per bushel) than truck costs; in the South Plains area, costs ranged from 1.0 cent at ports to 12.2 cents at country facilities. Standardization of costs increased total cost in country facilities by 0.5 cent per bushel and 0.1 cent at inland terminals, and had no effect at port terminals. The weighted average cost for the United States as a whole remained unchanged.

Costs for receiving grain by water averaged 1.0 cent per bushel for all plants, and ranged from 0.8 cent at Great Lakes ports to 3.4 cents at Eastern ports. Only minor differences were noted when costs were standardized or computed on replacement value.

The average total costs shown by warehouse records for loading out by truck were 2.2 cents per bushel for all types of plants combined; they ranged from a low of 0.8 cent at inland terminals in the South and East to a high of 3.9 cents at inland terminals in the West (table 12). With the exception of

inland terminals in the North Plains, only minor differences were noted when costs were computed using other methods. Average costs in the North Plains increased by 2.4 cents per bushel when standardized and by 4.6 cents when computed on the replacement concept.

Costs of loadout by rail were about equal for port and inland terminals, averaging 2.0 and 1.8 cents per bushel, respectively; however, such costs averaged 2.9 cents at country facilities. For all plants, standardization of depreciation and interest on investment increased costs by only 0.1 cent per bushel. Increases in costs due to the computation of replacement value averaged 0.3 cent per bushel at country and inland plants and 0.4 cent at port terminals. For the United States as a whole, average costs were increased by only 0.3 cent.

Cost of loadout by water averaged 0.7 cent and varied from 0.6 cent per bushel at Gulf ports to 1.0 cent per bushel in the West and Great Lakes ports. Only slight increases were noted when costs were derived by either standardization or replacement methods, averaging 0.1 cent per bushel higher than book costs.

Cost calculations were also made for commercial elevator services such as cleaning, drying, handling only, and shelling (tables 13-16). For all plants, the average book costs were 1.7, 3.8, 2.0, and 2.8 cents per bushel for cleaning, drying, handling only, and shelling, respectively.

Table 1.--Sample plants included in survey: Capacity, mode of transportation, and activity, by area and type of facility, fiscal 1964-65

Area and type of facility	Sample plants	Total capacity	Working capacity 1/	Storage capacity 2/	Average occupancy 3/	Received by--			Shipped by--			Cleaned	Dried	Handled only	Shelled
						Truck	Rail	Water	Truck	Rail	Water				
	No.	1,000 bu.			Pct.	1,000 bu.									
North Plains: 4/															
Country	33	5,331	426	4,905	79.5	9,033	593	--	3,243	6,391	--	2,782	632	116	--
Inland terminals	9	27,280	2,134	25,146	82.4	35,248	18,190	--	43	13,892	31,458	13,678	2,105	--	--
Port terminals	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total area	42	32,611	2,560	30,051	81.8	44,281	18,783	--	3,286	20,283	31,458	16,460	2,737	116	--
Mid-Plains: 5/															
Country	59	27,302	2,303	24,999	66.3	24,338	3,387	--	16,108	13,491	--	453	3,563	2,837	35
Inland terminals	26	99,188	5,393	93,795	52.4	17,013	93,135	--	4,875	83,645	--	20,096	1,965	3,234	40
Port terminals	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total area	85	126,490	7,696	118,794	55.3	41,351	96,522	--	20,983	97,136	--	20,549	5,528	6,071	75
South Plains: 6/															
Country	28	37,371	1,902	35,469	67.4	14,697	759	--	6,324	14,439	--	108	1,897	2,088	--
Inland terminals	8	17,843	1,054	16,789	64.3	2,697	9,273	--	948	6,906	--	238	--	10	--
Gulf Port terminals	7	33,371	4,546	28,825	74.6	56,072	222,476	158,771	5,609	2,881	424,450	11,045	3,970	--	--
Total area	43	88,585	7,502	81,083	69.3	73,466	232,508	158,771	12,881	24,226	424,450	11,391	5,867	2,098	--
West: 7/															
Country	15	6,015	310	5,705	41.6	6,498	6	--	922	4,752	--	1,327	--	48	--
Inland terminals	3	4,929	86	4,843	51.3	1,240	3,956	--	106	4,851	--	250	--	29	--
Port terminals	8	20,729	1,437	19,292	53.8	8,328	66,229	10,761	1,050	1,727	79,353	13,256	165	36	--
Total area	26	31,673	1,833	29,840	49.7	16,066	70,191	10,761	2,078	11,330	79,353	14,833	165	113	
Great Lakes: 8/															
Country	25	6,877	725	6,152	51.3	10,234	367	--	5,935	4,618	--	1,040	2,025	--	633
Inland terminals	7	26,099	2,497	23,602	48.7	21,986	23,234	--	2,314	24,503	--	6,855	9,252	--	--
Port terminals	9	29,488	2,978	26,510	75.9	38,285	48,381	22,682	193	22,673	78,774	12,188	9,172	--	--
Total area	41	62,464	6,200	56,264	62.8	70,505	71,982	22,682	8,442	51,794	78,774	20,083	20,449	--	633
South and East: 9/															
Country	5	3,987	390	3,597	49.4	4,366	162	--	1,723	3,069	--	1,317	775	--	--
Inland terminals	5	7,935	1,377	6,558	59.3	6,679	12,810	10,036	712	5,489	--	3,438	2,066	--	--
East Port terminals	5	11,915	1,398	10,517	65.3	6,648	58,421	1,466	169	1,439	65,857	9,566	8,735	--	--
Total area	15	23,837	3,165	20,672	60.6	17,693	71,393	11,502	2,604	9,997	65,857	14,321	11,576	--	--
United States:															
Country	165	86,883	6,056	80,827	63.9	69,166	5,274	--	34,255	46,760	--	7,027	8,892	5,089	668
Inland terminals	58	183,274	12,541	170,733	57.7	84,863	160,598	10,036	8,998	139,286	31,458	44,555	15,388	3,273	40
Port terminals	29	95,503	10,359	85,144	69.2	109,333	395,507	193,680	7,021	28,720	648,434	46,055	22,042	36	--
All facilities	252	365,660	28,956	336,704	62.1	263,362	561,379	203,716	50,274	214,766	679,892	97,637	46,322	8,398	708

1/ Estimated by warehouse operators as being necessary to receive, ship, clean, dry, etc., and not used for storage of grains.
2/ Estimated by warehouse as being used entirely to store grain.
3/ Percent of grain in store is of capacity used for storage (storage capacity).
4/ N. Dak., S. Dak., and Minn. (excluding port facilities).
5/ Nebr., Kans., Colo., Wyo., Iowa, and Mo.
6/ Okla., N. Mex., and Texas, plus all Gulf port facilities.
7/ Wash., Oreg., Idaho, Mont., Calif., Ariz., Nev., and Utah.
8/ Wis., Ill., Ind., Ohio, Mich., and Minn. port facilities.
9/ Ark., Miss., S.C., Tenn., Ky., N.Y., Va., Pa., N.J., and Md., Del., La. (excluding port facilities), Ala., Ga., N.C., W. Va., and New England.

Table 2.--Weighted average costs and estimated competitive rates for handling and storing grains by area, type of facility, and mode of transportation, United States, fiscal 1964-65

Area and type of facility	Receiving		Shipping		Storage		Combined		Estimated 1966 competitive rates	
	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Short run 3/	Long run 4/
	Cents									
North Plains										
Country:										
Truck & truck 5/	1.4	1.6	1.7	1.9	3.8	6.6	6.9	10.1	--	--
Truck & rail 6/	1.4	1.6	1.9	2.1	3.8	6.6	7.1	10.3	7.5	15.0
Rail & rail 7/	3.3	4.5	1.9	2.1	3.8	6.6	9.0	13.2	--	--
Inland terminal:										
Truck & truck	0.9	1.0	2.2	2.4	2.9	3.8	6.0	7.2	--	--
Truck & rail	0.9	1.0	2.3	2.4	2.9	3.8	6.1	7.2	--	--
Rail & rail	2.3	2.4	2.3	2.4	2.9	3.8	7.5	8.6	13.0	20.5
Port terminal:										
Rail & water 8/	--	--	--	--	--	--	--	--	--	--
Mid-Plains										
Country:										
Truck & truck	1.8	2.1	1.8	2.1	2.9	6.0	6.5	10.2	--	--
Truck & rail	1.8	2.1	2.6	3.0	2.9	6.0	7.3	11.1	8.0	13.0
Rail & rail	2.0	2.3	2.6	3.0	2.9	6.0	7.5	11.3	--	--
Inland terminal:										
Truck & truck	1.1	1.3	1.4	1.6	2.2	6.4	4.7	9.3	--	--
Truck & rail	1.1	1.3	1.6	1.8	2.2	6.4	4.9	9.5	--	--
Rail & rail	1.3	1.5	1.6	1.8	2.2	6.4	5.1	9.7	4.5	9.0
Port terminal:										
Rail & water	--	--	--	--	--	--	--	--	--	--
South Plains										
Country:										
Truck & truck	2.3	2.8	2.5	3.3	2.1	4.5	6.9	10.6	--	--
Truck & rail	2.3	2.8	2.8	3.6	2.1	4.5	7.2	10.9	9.5	12.5
Rail & rail	8.4	12.2	2.8	3.6	2.1	4.5	13.3	20.3	--	--
Inland terminal:										
Truck & truck	1.5	1.9	1.9	2.5	2.4	4.1	5.8	8.5	--	--
Truck & rail	1.5	1.9	2.8	3.3	2.4	4.1	6.7	9.3	--	--
Rail & rail	2.0	2.2	2.8	3.3	2.4	4.1	7.2	9.6	12.0	14.0
Port terminal:										
Rail & water	0.9	1.0	0.6	0.6	2.3	6.7	3.8	8.3	5.0	9.0
West										
Country:										
Truck & truck	1.6	1.8	1.8	2.0	3.8	6.2	7.2	10.0	--	--
Truck & rail	1.6	1.8	2.0	2.2	3.8	6.2	7.4	10.2	6.5	12.5
Rail & rail	4.2	4.2	2.0	2.2	3.8	6.2	10.0	12.6	--	--
Inland terminal:										
Truck & truck	1.2	1.7	3.1	3.9	3.4	6.9	7.7	12.5	--	--
Truck & rail	1.2	1.7	1.9	2.2	3.4	6.9	6.5	10.8	--	--
Rail & rail	2.2	2.5	1.9	2.2	3.4	6.9	7.5	11.6	5.5	8.5
Port terminal:										
Rail & water	1.3	1.7	0.8	1.0	2.0	8.3	4.1	11.0	4.5	11.5
Great Lakes										
Country:										
Truck & truck	1.8	2.1	1.7	2.1	4.0	7.1	7.5	11.3	--	--
Truck & rail	1.8	2.1	2.5	2.8	4.0	7.1	8.3	12.0	13.5	15.0
Rail & rail	5.0	6.0	2.5	2.8	4.0	7.1	11.5	15.9	--	--
Inland:										
Truck & truck	1.0	1.2	1.7	2.0	2.9	5.3	5.6	8.5	--	--
Truck & rail	1.0	1.2	1.3	1.4	2.9	5.3	5.2	7.9	--	--
Rail & rail	1.1	1.3	1.3	1.4	2.9	5.3	5.3	8.0	6.0	10.5
Port terminal:										
Rail & water	2.0	2.4	0.9	1.0	3.5	6.9	6.4	10.3	9.0	15.0

--Continued

Table 2.--Weighted average costs and estimated competitive rates for handling and storing grains by area, type of facility, and mode of transportation, United States, fiscal 1964-65--Cont.

Area and type of facility	Receiving		Shipping		Storage		Combined		Estimated 1966 competitive rates	
	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Out-of-pocket costs 1/	Total cost 2/	Short run 3/	Long run 4/
	Cents									
South & East										
Country:										
Truck & truck	1.4	1.6	2.3	2.7	3.4	5.8	7.1	10.1	--	--
Truck & rail	1.4	1.6	1.6	1.8	3.4	5.8	6.4	9.2	6.5	10.0
Rail & rail	2.6	3.2	1.6	1.8	3.4	5.8	7.6	10.8	--	--
Inland terminal:										
Truck & truck	0.8	0.9	0.7	0.8	4.6	6.4	6.1	8.1	--	--
Truck & rail	0.8	0.9	0.6	0.7	4.6	6.4	6.0	8.0	--	--
Rail & rail	1.9	2.0	0.6	0.7	4.6	6.4	7.1	9.1	7.5	15.5
Port terminal:										
Rail & water	1.4	1.5	0.7	0.9	2.2	7.7	4.3	10.1	4.0	11.0
United States										
Country:										
Truck & truck	1.8	2.1	1.9	2.3	2.7	5.4	6.4	9.8	--	--
Truck & rail	1.8	2.1	2.4	2.9	2.7	5.4	6.9	10.4	8.0	13.5
Rail & rail	3.3	4.3	2.4	2.9	2.7	5.4	8.4	12.6	--	--
Inland terminal:										
Truck & truck	1.0	1.1	1.5	1.7	2.6	5.5	5.1	8.3	--	--
Truck & rail	1.0	1.1	1.6	1.8	2.6	5.5	5.2	8.4	--	--
Rail & rail	1.5	1.7	1.6	1.8	2.6	5.5	5.7	9.0	7.0	12.0
Port terminal:										
Rail & water	1.2	1.4	0.6	0.7	2.7	7.2	4.5	9.3	7.0	13.5

1/ Excludes depreciation or interest on investment.

2/ Includes depreciation and interest on investment as shown on warehouse records.

3/ Out-of-pocket costs of marginal firms.

4/ Total costs of marginal firms operating at 75 percent average occupancy and including depreciation and interest based on replacement values.

5/ Grain received by truck and shipped by truck.

6/ Grain received by truck and shipped by rail.

7/ Grain received by rail and shipped by rail.

8/ Grain received by rail and shipped by water.

NOTE: See table 1 for delineation of areas and sample for which data were obtained.

Table 3.--Estimated maximum storage requirements, by area and type of facility 1/

Area	Type of facility			
	Country	Inland terminal	Port terminal	Total
	Millions of bushels			
North Plains	345	104	--	449
Mid-Plains	971	291	--	1,262
South Plains	520	147	44	711
West	153	20	42	215
Great Lakes	438	95	113	646
South and East	173	52	33	258
United States	2,600	709	232	3,541

1/ Estimated on basis of maximum stocks, adjusted for required working space. Maximum stocks estimated on basis of total supply and disappearance projections by time periods.

NOTE: See table 1 for delineation of areas.

Table 4.--Grain-storage capacity of country plants by out-of-pocket handling and storage costs, selected U.S. areas and United States, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--					
	North Plains	Mid-Plains	South Plains	West	Great Lakes	United States 2/
	1,000 bushels					
Less than--						
4.0	--	--	24,775	--	40,774	117,057
4.5	--	54,941	24,775	17,549	59,128	207,901
5.0	28,374	61,747	69,904	27,506	87,589	326,628
5.5	28,374	258,621	133,644	128,818	146,950	747,915
6.0	61,566	605,224	240,001	128,818	146,950	1,234,067
6.5	86,193	715,665	247,538	181,901	167,976	1,624,510
7.0	169,068	825,363	247,538	281,533	188,653	1,937,392
7.5	345,526	934,874	286,178	281,533	243,367	2,316,715
8.0	409,235	1,068,826	325,050	281,533	243,367	2,624,660
8.5	409,235	1,068,826	352,291	291,490	243,367	2,661,858
9.0	432,577	1,158,787	352,291	291,490	252,660	2,784,454
9.5	470,160	1,197,395	551,140	291,490	252,660	3,059,494
10.0	495,108	1,306,104	551,140	291,490	278,681	3,219,172
10.5	500,248	1,312,848	551,140	291,490	390,548	3,342,923
11.0	512,026	1,417,968	658,729	291,490	390,548	3,567,410
11.5	512,026	1,429,661	694,344	291,490	390,548	3,614,718
12.0	512,026	1,526,613	717,653	291,490	415,059	3,759,490
12.5	527,980	1,527,727	721,143	316,445	415,059	3,805,003
13.0	527,980	1,527,727	724,842	316,445	427,605	3,821,248
13.5	527,980	1,561,137	724,842	316,445	643,673	4,070,726
14.0	527,980	1,561,137	726,680	316,445	643,673	4,072,564
14.5	527,980	1,561,137	726,680	316,445	643,673	4,072,564
15.0	543,613	1,561,137	726,680	321,548	687,816	4,137,443
All plants	570,810	1,689,210	869,350	374,320	798,870	4,650,630

1/ For grain received by truck and shipped by rail.
2/ Includes South and East.

NOTE: See table 1 for delineation of areas.

Table 5.--Grain-storage capacity of inland terminals by out-of-pocket handling and storage costs, selected U.S. areas and United States, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--					
	North Plains	Mid-Plains	South Plains	West	Great Lakes	United States 2/
	1,000 bushels					
Less than--						
4.0	--	54,531	16,376	--	5,913	76,820
4.5	--	316,602	16,376	--	5,913	338,891
5.0	--	316,602	16,376	--	86,962	419,940
5.5	--	341,361	16,376	20,463	86,962	465,162
6.0	--	393,584	53,623	20,463	86,962	554,632
6.5	--	468,059	74,066	20,463	97,878	660,466
7.0	52,706	504,362	74,066	20,463	97,878	749,475
7.5	96,425	543,794	74,066	20,463	118,710	901,129
8.0	96,425	600,272	89,267	20,463	118,710	977,660
8.5	98,887	600,272	89,267	20,463	118,710	981,803
9.0	98,887	600,272	89,267	20,463	118,710	983,639
9.5	98,887	616,373	89,267	20,463	118,710	999,740
10.0	98,887	616,373	89,267	20,463	118,710	999,740
10.5	98,887	616,373	89,267	20,463	118,710	999,740
11.0	98,887	616,373	89,267	20,463	118,710	999,740
11.5	98,887	616,373	89,267	20,463	118,710	999,740
12.0	98,887	630,950	191,244	20,463	118,710	1,116,294
12.5	98,887	630,950	191,244	20,463	118,710	1,116,294
13.0	104,367	630,950	191,244	20,463	118,710	1,121,774
13.5	104,367	630,950	191,244	20,463	118,710	1,121,774
14.0	104,367	630,950	191,244	20,463	118,710	1,121,774
14.5	104,367	630,950	191,244	27,610	118,710	1,128,921
15.0	104,367	630,950	191,244	27,610	118,710	1,128,921
All plants	127,230	637,520	246,790	27,610	118,710	1,213,900

1/ For grain received by rail and shipped by rail.
2/ Includes South and East.

NOTE: See table 1 for delineation of areas.

Table 6.--Grain-storage capacity of port terminals by out-of-pocket handling and storage costs, selected U.S. areas and United States, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--				
	South Plains	West	Great Lakes	South & East	United States
	1,000 bushels				
Less than--					
4.0	41,964	41,926	--	33,834	117,724
4.5	41,964	44,541	--	33,834	120,339
5.0	49,556	44,541	--	33,834	127,931
5.5	65,366	44,541	35,261	33,834	179,002
6.0	65,366	44,541	51,155	33,834	194,896
6.5	65,366	50,342	51,155	42,904	209,767
7.0	65,366	50,342	93,676	42,904	252,288
7.5	65,366	50,342	93,676	42,904	252,288
8.0	65,366	50,342	93,676	42,904	252,288
8.5	65,366	54,386	103,534	42,904	266,190
9.0	65,366	54,386	123,239	42,904	285,895
9.5	65,366	54,386	137,499	46,752	304,003
10.0	65,366	54,386	142,539	46,752	309,043
10.5	65,366	58,069	142,539	46,752	312,726
11.0	65,366	58,069	142,539	46,752	312,726
11.5	65,366	58,069	142,539	46,752	312,726
12.0	65,366	58,069	142,539	46,752	312,726
12.5	65,366	58,069	142,539	46,752	312,726
13.0	65,366	59,830	152,910	48,570	326,676
13.5	68,460	59,830	152,910	48,570	329,770
14.0	68,460	59,830	152,910	48,570	329,770
14.5	68,460	59,830	152,910	48,570	329,770
15.0	68,460	59,830	152,910	48,570	329,770
All plants	68,460	59,830	152,910	48,570	329,770

1/ For grain received by rail and shipped by water.

NOTE: See table 1 for delineation of areas.

Table 7.--Grain-storage capacity of country plants by total handling and storage costs based on replacement values and volumes equivalent to 75 percent occupancy, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--					
	North Plains	Mid-Plains	South Plains	West	Great Lakes	United States 2/
	1,000 bushels					
Less than--						
7.0	--	98,685	--	--	--	98,685
8.0	--	117,432	32,684	--	18,354	168,470
9.0	20,879	216,859	96,424	--	46,815	380,977
10.0	28,374	330,454	161,164	--	46,815	740,536
11.0	40,473	735,649	300,065	--	46,815	1,296,731
12.0	102,040	872,756	419,100	94,155	75,392	1,737,172
13.0	144,763	973,668	539,648	259,752	136,030	2,279,098
14.0	324,862	1,193,559	573,146	259,752	426,560	3,074,528
15.0	399,599	1,391,671	703,323	266,909	463,617	3,521,768
16.0	451,851	1,491,964	703,323	266,909	515,891	3,726,587
17.0	480,012	1,507,556	708,604	286,823	575,252	3,854,896
18.0	493,931	1,536,821	708,604	315,200	601,273	3,968,891
19.0	528,516	1,536,821	708,604	340,155	601,273	4,028,431
20.0	554,321	1,536,821	721,352	357,642	601,273	4,084,471
21.0	554,321	1,550,618	835,920	357,642	629,966	4,241,529
22.0	554,321	1,565,220	841,248	362,745	634,380	4,270,976
23.0	569,097	1,565,220	841,248	369,590	634,380	4,292,597
24.0	569,097	1,595,103	841,248	369,590	678,523	4,366,623
25.0	569,097	1,598,877	841,248	374,320	711,630	4,443,242
26.0	569,097	1,607,787	841,248	374,320	720,923	4,461,445
27.0	569,097	1,615,768	841,248	374,320	720,923	4,469,426
28.0	569,097	1,615,768	841,248	374,320	744,853	4,493,356
29.0	569,097	1,650,230	841,248	374,320	744,853	4,527,818
30.0	569,097	1,650,230	843,714	374,320	749,616	4,535,047
All plants	570,810	1,689,210	869,350	374,320	798,870	4,650,630

1/ For grain received by truck and shipped by rail.
2/ Includes South and East.

NOTE: See table 1 for delineation of areas.

Table 8.--Grain-storage capacity of inland terminals by total handling and storage costs based on replacement values and volumes equivalent to 75 percent occupancy, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--					
	North Plains	Mid-Plains	South Plains	West	Great Lakes	United States 2/
	1,000 bushels					
Less than--						
7.0	--	234,446	16,376	--	5,913	256,735
8.0	--	290,995	16,376	10,027	5,913	323,311
9.0	--	303,850	16,376	20,463	92,420	433,109
10.0	15,866	320,594	16,376	20,463	92,420	465,719
11.0	68,572	435,999	16,376	20,463	118,710	660,120
12.0	87,097	466,921	74,066	20,463	118,710	767,257
13.0	87,097	541,435	176,043	20,463	118,710	943,748
14.0	96,425	567,935	191,244	20,463	118,710	994,777
15.0	96,425	596,833	191,244	20,463	118,710	1,023,675
16.0	96,425	596,833	191,244	20,463	118,710	1,023,675
17.0	96,425	605,343	191,244	20,463	118,710	1,032,185
18.0	96,425	605,343	191,244	27,610	118,710	1,039,332
19.0	96,425	610,254	191,244	27,610	118,710	1,044,243
20.0	96,425	610,254	246,790	27,610	118,710	1,099,789
21.0	104,367	635,861	246,790	27,610	118,710	1,133,338
22.0	104,367	635,861	246,790	27,610	118,710	1,133,338
23.0	104,367	635,861	246,790	27,610	118,710	1,133,338
24.0	110,197	635,861	246,790	27,610	118,710	1,139,168
25.0	110,197	635,861	246,790	27,610	118,710	1,139,168
26.0	110,197	635,861	246,790	27,610	118,710	1,139,168
27.0	110,197	635,861	246,790	27,610	118,710	1,139,168
28.0	110,197	635,861	246,790	27,610	118,710	1,139,168
29.0	110,197	637,520	246,790	27,610	118,710	1,140,827
30.0	110,197	637,520	246,790	27,610	118,710	1,140,827
All plants	127,230	637,520	246,790	27,610	118,710	1,213,900

1/ For grain received by rail and shipped by rail. Receipts and shipments equal 2.2 times average volume stored.

2/ Includes South and East.

NOTE: See table 1 for delineation of areas.

Table 9.--Grain-storage capacity of port terminals by total handling and storage costs based on replacement values and volumes equivalent to 75 percent occupancy, fiscal 1964-65

Costs per bushel (cents) 1/	Storage capacity of plants in--				
	Gulf	West	Great Lakes	East	United States
	1,000 bushels				
Less than--					
7.0	9,203	--	--	--	9,203
8.0	16,795	13,580	--	19,567	49,942
9.0	45,295	13,580	--	19,567	78,442
10.0	45,295	31,977	35,261	19,567	132,100
11.0	54,009	41,926	66,898	42,904	205,737
12.0	65,366	50,342	66,898	42,904	225,510
13.0	65,366	50,342	66,898	42,904	225,510
14.0	65,366	50,342	97,052	42,904	255,664
15.0	65,366	50,342	127,128	42,904	285,740
16.0	65,366	50,342	127,128	42,904	285,740
17.0	65,366	50,342	132,168	42,904	290,780
18.0	65,366	50,342	132,168	42,904	290,780
19.0	65,366	50,342	132,168	42,904	290,780
20.0	65,366	54,386	152,910	42,904	315,566
21.0	65,366	58,069	152,910	42,904	319,249
22.0	68,460	58,069	152,910	42,904	322,343
23.0	68,460	59,830	152,910	42,904	324,104
24.0	68,460	59,830	152,910	42,904	324,104
25.0	68,460	59,830	152,910	42,904	324,104
26.0	68,460	59,830	152,910	46,752	327,952
27.0	68,460	59,830	152,910	46,752	327,952
28.0	68,460	59,830	152,910	48,570	329,770
29.0	68,460	59,830	152,910	48,570	329,770
30.0	68,460	59,830	152,910	48,570	329,770
All plants	68,460	59,830	152,910	48,570	329,770

1/ For grain received by rail and shipped by water. Receipts and shipments equal 11.7 times average volume stored.

NOTE: See table 1 for delineation of areas.

Table 10.--Storage: Weighted average costs per bushel by costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Costing method			
	Book costs		Standardized cost 4/	Replacement cost 5/
	Out-of-pocket 2/	Total 3/		
	Cents			
North Plains:				
Country	3.8	6.6	7.6	8.9
Inland terminals	2.9	3.8	4.8	6.4
Port terminals	--	--	--	--
Mid-Plains:				
Country	2.9	6.0	7.0	7.2
Inland terminals	2.2	6.4	7.8	6.9
Port terminals	--	--	--	--
South Plains:				
Country	2.1	4.5	4.5	4.9
Inland terminals	2.4	4.1	4.5	5.4
Gulf port terminals	2.3	6.7	5.9	7.5
West:				
Country	3.8	6.2	8.8	12.8
Inland terminals	3.4	6.9	7.3	7.8
Port terminals	2.0	8.3	9.0	10.6
Great Lakes:				
Country	4.0	7.1	8.3	9.5
Inland terminals	2.9	5.3	6.4	8.1
Port terminals	3.5	6.9	7.9	9.2
South and East:				
Country	3.4	5.8	7.6	9.5
Inland terminals	4.6	6.4	7.9	13.6
East port terminals	2.2	7.7	8.8	9.8
United States:				
Country	2.7	5.4	6.1	6.7
Inland terminals	2.6	5.5	6.6	7.1
Port terminals	2.7	7.2	7.5	8.9
Average U.S.	2.6	5.9	6.7	7.5

1/ Based on 252 commercial elevators.
2/ Excludes depreciation or interest on investment.
3/ Includes interest on investment as shown on warehouse records.
4/ Depreciation calculated for all plants based on rates on page 26; interest on investment calculated at 6 percent of half of original acquisition cost.
5/ Cost based on rebuilding present facilities using 1964 building cost; includes interest on investment calculated at 6 percent of half of rebuilding cost.

NOTE: See table 1 for delineation of areas.

Table 11.--Receiving: Weighted average total cost per bushel by mode of transportation, costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Mode of transportation and costing method 2/ for grain received by--								
	Truck			Rail			Water		
	Book cost	Standardized cost	Replacement cost	Book cost	Standardized cost	Replacement cost	Book cost	Standardized cost	Replacement cost
	Cents								
North Plains:									
Country	1.6	1.7	1.9	4.5	4.3	4.6	--	--	--
Inland terminals	1.0	1.1	1.2	2.4	2.7	3.1	--	--	--
Port terminals	--	--	--	--	--	--	--	--	--
Mid-Plains:									
Country	2.1	2.1	2.2	2.3	2.8	2.9	--	--	--
Inland terminals	1.3	1.4	1.5	1.5	1.6	1.8	--	--	--
Port terminals	--	--	--	--	--	--	--	--	--
South Plains:									
Country	2.8	2.9	3.0	12.2	13.5	13.4	--	--	--
Inland terminals	1.9	1.9	2.4	2.2	2.2	2.8	--	--	--
Gulf ports	1.1	1.0	1.4	1.0	1.0	1.1	1.0	1.0	1.0
West:									
Country	1.8	1.9	2.4	4.2	4.4	7.1	--	--	--
Inland terminals	1.7	1.6	1.6	2.5	2.5	2.5	--	--	--
Port terminals	1.3	1.6	1.8	1.7	1.8	2.0	0.9	0.9	1.1
Great Lakes:									
Country	2.1	2.2	2.3	6.0	6.4	6.6	--	--	--
Inland terminals	1.2	1.2	1.4	1.3	1.3	1.6	--	--	--
Port terminals	1.2	1.2	1.1	2.4	2.5	2.6	0.8	0.9	0.9
South and East:									
Country	1.6	1.7	1.8	3.2	3.5	3.6	--	--	--
Inland terminals	0.9	1.0	1.0	2.0	2.0	2.7	1.2	1.3	1.8
East ports	1.2	1.2	1.2	1.5	1.5	1.5	3.4	3.6	3.5
United States:									
Country	2.1	2.2	2.3	4.3	4.8	4.9	--	--	--
Inland terminals	1.1	1.2	1.3	1.7	1.8	2.1	1.2	1.3	1.8
Port terminals	1.1	1.2	1.3	1.4	1.4	1.5	1.0	1.0	1.0
Average U.S.	1.4	1.4	1.6	1.5	1.5	1.7	1.0	1.0	1.1

1/ See table 10, footnote 1. 2/ See table 10 for definitions of various types of costs.
NOTE: See table 1 for delineation of areas.

Table 12.--Loadout: Weighted average total cost per bushel by mode of transportation, costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Mode of transportation and costing method 2/ for grain loaded out by--								
	Truck			Rail			Water		
	Book cost	Standardized cost	Replacement cost	Book cost	Standardized cost	Replacement cost	Book cost	Standardized cost	Replacement cost
	Cents								
North Plains:									
Country	1.9	2.1	2.2	2.1	2.2	2.3	--	--	--
Inland terminals	2.4	4.8	7.0	2.4	2.4	2.6	0.8	0.8	0.9
Port terminals	--	--	--	--	--	--	--	--	--
Mid-Plains:									
Country	2.1	2.2	2.3	3.0	3.4	3.5	--	--	--
Inland terminals	1.6	1.7	1.8	1.8	1.8	2.2	--	--	--
Port terminals	--	--	--	--	--	--	--	--	--
South Plains:									
Country	3.3	3.3	3.4	3.6	3.8	3.9	--	--	--
Inland terminals	2.5	2.3	2.4	3.3	3.2	3.5	--	--	--
Gulf ports	2.5	2.5	2.1	1.2	1.2	2.7	0.6	0.6	0.7
West:									
Country	2.0	2.3	3.0	2.2	2.4	2.9	--	--	--
Inland terminals	3.9	3.7	3.6	2.2	2.2	2.2	--	--	--
Port terminals	1.5	1.6	1.8	3.4	3.7	3.7	1.0	1.0	1.4
Great Lakes:									
Country	2.1	2.1	2.2	2.8	2.9	3.0	--	--	--
Inland terminals	2.0	2.1	2.1	1.4	1.4	1.4	--	--	--
Port terminals	2.6	3.4	3.8	2.0	2.2	2.3	1.0	1.1	1.2
South and East:									
Country	2.7	2.8	3.2	1.8	2.0	2.1	--	--	--
Inland terminals	0.8	0.9	0.8	0.7	0.7	0.8	--	--	--
East ports	2.9	2.8	3.4	1.9	1.8	2.1	0.9	1.0	0.9
United States:									
Country	2.3	2.4	2.5	2.9	3.1	3.2	--	--	--
Inland terminals	1.7	1.8	1.9	1.8	1.9	2.1	0.8	0.8	0.9
Port terminals	2.4	2.4	2.1	2.0	2.2	2.4	0.7	0.8	0.8
Average U.S.	2.2	2.3	2.4	2.1	2.2	2.4	0.7	0.8	0.8

1/ See table 10, footnote 1. 2/ See table 10 for definitions of various types of costs.

NOTE: See table 1 for delineation of areas.

Table 13.--Cleaning: Weighted average costs per bushel by costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Costing method 2/		
	Book cost	Standardized cost	Replacement cost
	Cents		
North Plains:			
Country	2.3	2.5	2.8
Inland terminals	1.4	1.7	2.0
Port terminals	--	--	--
Mid-Plains:			
Country	3.7	4.3	3.9
Inland terminals	0.5	0.6	0.7
Port terminals	--	--	--
South Plains:			
Country	10.9	8.9	10.1
Inland terminals	3.1	3.4	3.7
Gulf port terminals	1.7	1.7	1.4
West:			
Country	1.8	2.0	2.7
Inland terminals	11.3	10.8	10.5
Port terminals	2.8	2.8	3.0
Great Lakes:			
Country	2.2	2.4	3.0
Inland terminals	1.8	2.1	2.2
Port terminals	2.9	3.1	2.8
South and East:			
Country	0.5	0.5	0.7
Inland terminals	1.1	1.2	1.4
East port terminals	1.0	1.0	1.9
United States:			
Country	2.1	2.2	2.6
Inland terminals	1.1	1.3	1.5
Port terminals	2.2	2.2	2.4
Average U.S.	1.7	1.8	2.0

1/ Based on 101 commercial elevators.
2/ See table 10 for definitions of various types of costs.

NOTE: See table 1 for delineation of areas.

Table 14.--Drying: Weighted average costs per bushel by costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Costing method 2/		
	Book cost	Standardized cost	Replacement cost
	Cents		
North Plains:			
Country	4.2	4.5	5.0
Inland terminals	3.1	4.1	6.7
Port terminals	--	--	--
Mid-Plains:			
Country	5.1	5.3	5.9
Inland terminals	6.7	7.5	8.9
Port terminals	--	--	--
South Plains:			
Country	5.5	5.6	6.0
Inland terminals	--	--	--
Gulf port terminals	5.7	5.6	4.5
West:			
Country	--	--	--
Inland terminals	--	--	--
Port terminals	3.4	3.4	8.0
Great Lakes:			
Country	3.6	3.9	4.1
Inland terminals	3.9	4.1	4.8
Port terminals	3.2	3.3	3.0
South and East:			
Country	3.0	3.2	3.3
Inland terminals	1.6	2.3	2.5
East port terminals	2.7	2.7	2.8
United States:			
Country	4.6	4.8	5.2
Inland terminals	3.8	4.3	5.2
Port terminals	3.4	3.5	3.2
Average U.S.	3.8	4.0	4.3

1/ Based on 92 commercial elevators.
2/ See table 10 for definitions of various types of costs.

NOTE: See table 1 for delineation of areas.

Table 15.--Handle only: Weighted average costs per bushel by costing method, area and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Costing method 2/		
	Book cost	Standardized cost	Replacement cost
	Cents		
North Plains:			
Country	8.6	8.7	9.8
Inland terminals	--	--	--
Port terminals	--	--	--
Mid-Plains:			
Country	1.9	1.9	1.7
Inland terminals	1.6	1.6	1.8
Port terminals	--	--	--
South Plains:			
Country	2.2	2.3	2.4
Inland terminals	12.9	13.9	13.8
Gulf port terminals	--	--	--
West:			
Country	2.7	2.7	2.8
Inland terminals	3.0	3.8	4.0
Port terminals	3.4	4.0	3.5
Great Lakes:			
Country	--	--	--
Inland terminals	--	--	--
Port terminals	--	--	--
South and East:			
Country	--	--	--
Inland terminals	--	--	--
East port terminals	--	--	--
United States:			
Country	2.2	2.2	2.2
Inland terminals	1.6	1.7	1.9
Port terminals	3.4	4.0	3.5
Average U.S.	2.0	2.0	2.1

1/ Based on 21 commercial elevators.
2/ See table 10 for definitions of various types of costs.

NOTE: See table 1 for delineation of areas.

Table 16.--Shelling: Weighted average cost per bushel by costing method, area, and type of facility, United States, fiscal 1964-65 1/

Area and type of facility	Costing method 2/		
	Book cost	Standardized cost	Replacement cost
	Cents		
North Plains:			
Country	--	--	--
Inland terminals	--	--	--
Port terminals	--	--	--
Mid-Plains:			
Country	6.5	7.5	8.5
Inland terminals	0.8	1.0	1.0
Port terminals	--	--	--
South Plains:			
Country	--	--	--
Inland terminals	--	--	--
Gulf port terminals	--	--	--
West:			
Country	--	--	--
Inland terminals	--	--	--
Port terminals	--	--	--
Great Lakes:			
Country	2.8	2.7	3.2
Inland terminals	--	--	--
Port terminals	--	--	--
South and East:			
Country	--	--	--
Inland terminals	--	--	--
East port terminals	--	--	--
United States:			
Country	3.0	3.0	3.5
Inland terminals	0.8	11.2	16.9
Port terminals	--	--	--
Average U.S.	2.8	3.5	4.2

1/ Based on 12 commercial elevators.
2/ See table 10 for definitions of various types of costs.

NOTE: See table 1 for delineation of areas.

Table 17.--All facilities: Weighted average costs per bushel, handling and storing grains, United States, fiscal 1964-65

Cost item	Received by--			Loadout by--			Storage	Cleaning	Drying	Handled only	Shelling
	Truck	Rail	Water	Truck	Rail	Water					
	Cents										
Building & equipment insurance	.009	.008	.004	.019	.012	.004	.136	.015	.028	.008	.047
Building & equipment taxes	.037	.031	.012	.061	.063	.010	.736	.100	.135	.050	.069
Licenses & bonds	--	--	--	--	--	--	.039	--	--	--	--
Building & equipment lease	.061	.071	.060	.120	.060	.067	1.622	.221	.386	.099	.029
Building & equipment depreciation: 1/											
Book cost	.143	.095	.045	.271	.174	.038	1.298	.193	.534	.141	.950
Standardized cost	.145	.113	.042	.247	.193	.038	1.291	.229	.559	.117	1.400
Replacement cost	.296	.281	.114	.381	.375	.142	2.620	.455	1.031	.219	1.708
Interest on investment: 2/											
Book cost	.030	.031	.024	.052	.025	.018	.378	.063	.067	.028	.054
Standardized cost	.080	.065	.030	.141	.114	.027	1.172	.144	.255	.091	.214
Replacement cost	.139	.138	.067	.197	.200	.079	2.251	.304	.446	.140	.692
Total fixed costs: 3/											
Book cost	.280	.236	.145	.523	.334	.137	4.209	.592	1.150	.326	1.149
Standardized cost	.332	.288	.148	.588	.442	.146	4.996	.709	1.363	.365	1.759
Replacement cost	.481	.458	.197	.658	.650	.235	5.782	.874	1.640	.417	2.516
Variable costs: 4/											
Direct labor	.576	.733	.515	.773	.910	.304	.370	.561	1.062	1.012	.894
Administrative overhead	.167	.151	.093	.271	.337	.075	.229	.132	.253	.329	.298
Electricity, heat, etc.	.073	.060	.034	.124	.086	.026	.089	.158	.305	.119	.187
Drier fuel	--	--	--	--	--	--	--	--	.575	--	--
Truck expense	.035	.008	.007	.114	.033	.006	--	--	--	--	--
Building repairs	.009	.004	.005	.007	.008	.005	.457	.005	.006	.034	.003
Equipment repairs	.074	.051	.036	.091	.047	.026	.027	.158	.260	.046	.093
Insurance on grain	--	--	--	--	--	--	.187	--	--	--	--
Taxes on grain	--	--	--	--	--	--	.038	--	--	--	--
Fumigation	--	--	--	--	--	.035	.143	--	--	--	--
Supplies	.018	.010	.005	.039	.030	.005	.025	.010	.019	.023	.050
Telephone, telegraph	.015	.008	.001	.031	.026	.003	.017	.006	.016	.014	.031
Switching and coopering	.028	.111	.099	.019	.080	.042	--	.001	--	--	--
Protective services	.003	.005	.003	.001	.005	.004	.005	.005	.002	--	--
Weigh and inspect	.026	.039	.051	.029	.037	.043	--	--	--	--	--
Brokers and commission	.002	.001	--	.006	.004	--	.003	.001	.001	.001	--
Audit and legal	.009	.003	--	.025	.013	.004	.017	.004	.007	.006	.022
Other 5/	.067	.037	.009	.144	.101	.029	.098	.033	.069	.061	.092
Interest on working capital 6/	.014	.011	.007	.035	.019	.005	.027	.024	.066	.007	.025
Total variable costs	1.116	1.232	.865	1.709	1.736	.612	1.732	1.098	2.641	1.652	1.695
Grand total: 7/											
Book cost	1.396	1.468	1.010	2.232	2.070	.749	5.941	1.690	3.791	1.978	2.844
Standardized cost	1.448	1.520	1.013	2.297	2.178	.758	6.728	1.807	4.004	2.017	3.454
Replacement cost	1.597	1.690	1.062	2.367	2.386	.847	7.514	1.972	4.281	2.069	4.211

1/ Book cost--cost as shown on warehouse records; standardized cost--depreciation calculated using rates shown on page 26; replacement cost--cost based on rebuilding present facilities at 1964 costs.

2/ Book cost--as shown on warehouse records; standardized cost--calculated at rate of 6 percent of half of original acquisition cost; replacement cost--calculated at 6 percent of half of rebuilding present facilities at 1964 cost.

3/ Book cost--total of all costs as shown on warehouse records; standardized cost--total of warehouse cost with depreciation and interest computed at same rate for all plants; replacement cost--total of warehouse cost with depreciation and interest based on 1964 building costs.

4/ As shown on warehouse records.

5/ Includes dues, subscriptions, travel, advertising, donations, etc.

6/ Calculated at 6 percent per annum, borrowed quarterly, of the "out-of-pocket costs"; actual expenditures of this nature were eliminated.

7/ Total of 3 and 4.

Table 18.--All country warehouses: Weighted average costs per bushel, handling and storing grains, United States, fiscal 1964-65

Cost item 1/	Received by--			Loadout by--			Storage	Cleaning	Drying	Handled only	Shelling
	Truck	Rail	Water	Truck	Rail	Water					
	Cents										
Building & equipment insurance	.017	.019	--	.018	.020	--	.173	.032	.045	.007	.049
Building & equipment taxes	.050	.114	--	.062	.073	--	.597	106	.119	.046	.065
Licenses and bonds	--	--	--	--	--	--	.070	--	--	--	--
Building & equipment lease	.018	.121	--	.023	.051	--	.258	.016	.044	.144	.032
Building & equipment depreciation:											
Book cost	.278	.783	--	.344	.360	--	1.914	.450	1.274	.204	1.004
Standardized cost	.262	.970	--	.303	.414	--	1.620	.437	1.232	.157	.869
Replacement cost	.387	1.105	--	.429	.536	--	2.130	.741	1.534	.232	1.108
Interest on investment:											
Book cost	.042	.069	--	.065	.053	--	.514	.058	.146	.044	.056
Standardized cost	.131	.369	--	.165	.221	--	1.482	.227	.409	.121	.218
Replacement cost	.180	.469	--	.208	.278	--	1.894	.315	.556	.159	.469
Total fixed costs:											
Book cost	.405	1.106	--	.512	.557	--	3.526	.662	1.628	.445	1.206
Standardized cost	.478	1.593	--	.571	.779	--	4.200	.818	1.849	.475	1.233
Replacement cost	.634	1.707	--	.717	.907	--	4.864	1.194	2.254	.444	1.691
Variable costs:											
Direct labor	.720	1.190	--	.832	1.062	--	.451	.632	1.096	.858	.931
Administrative overhead	.335	.992	--	.312	.486	--	.335	.228	.471	.469	.316
Electricity, heat, etc.	.087	.128	--	.114	.120	--	.093	.150	.311	.140	.190
Drier fuel	--	--	--	--	--	--	--	--	.570	--	--
Truck expense	.106	.070	--	.150	.081	--	--	--	--	--	--
Building repairs	.017	.005	--	.008	.023	--	.336	.004	.011	.056	.003
Equipment repairs	.050	.115	--	.058	.083	--	.026	.096	.173	.056	.098
Insurance on grain	--	--	--	--	--	--	.217	--	--	--	--
Taxes on grain	--	--	--	--	--	--	.026	--	--	--	--
Fumigation	--	--	--	--	--	--	.190	--	--	--	--
Supplies	.048	.042	--	.048	.049	--	.032	.058	.048	.035	.052
Telephone, telegraph	.028	.049	--	.031	.039	--	.018	.030	.028	.017	.033
Switching and coopering	.097	.130	--	.025	.094	--	--	--	--	--	--
Protective services	.002	.008	--	.002	.004	--	.002	--	--	--	--
Weigh and inspect	.017	.097	--	.016	.037	--	.001	--	--	--	--
Brokers and commission	.008	.002	--	.008	.006	--	.006	.006	.005	--	--
Audit and legal	.028	.028	--	.031	.028	--	.018	.029	.027	.009	.021
Other	.152	.279	--	.169	.198	--	.094	.152	.182	.086	.090
Interest on working capital	.020	.036	--	.023	.028	--	.028	.023	.038	.011	.026
Total variable costs	1.715	3.171	--	1.827	2.338	--	1.873	1.408	2.960	1.737	1.760
Grand total:											
Book cost	2.120	4.277	--	2.339	2.895	--	5.398	2.070	4.588	2.182	2.966
Standardized cost	2.193	4.764	--	2.398	3.117	--	6.073	2.226	4.809	2.212	2.993
Replacement cost	2.349	4.878	--	2.544	3.245	--	6.737	2.602	5.214	2.181	3.451

1/ See footnotes, table 17, for explanation of various cost items.

Table 19.--All inland terminals: Weighted average costs per bushel, handling and storing grains, United States, fiscal 1964-65

Cost item 1/	Received by--			Loadout by--			Storage	Cleaning	Drying	Handled only	Shelling
	Truck	Rail	Water	Truck	Rail	Water					
	Cents										
Building & equipment insurance	.007	.007	.005	.009	.007	.004	.091	.010	.021	.009	.013
Building & equipment taxes	.046	.052	.066	.081	.053	.019	.807	.097	.171	.059	.127
Licenses & bonds	--	--	--	--	--	--	.025	--	--	--	--
Building & equipment lease	.009	.034	.001	.010	.053	--	1.707	.017	.065	.022	--
Building & equipment depreciation:											
Book cost	.135	.131	.084	.191	.117	.087	1.048	.114	.576	.045	.058
Standardized cost	.155	.167	.150	.208	.118	.115	1.366	.181	.755	.058	10.273
Replacement cost	.240	.373	.490	.273	.306	.135	2.383	.329	1.509	.194	11.693
Interest on investment:											
Book cost	.013	.009	.007	.037	.010	.005	.129	.021	.051	.002	--
Standardized cost	.073	.068	.038	.130	.071	.050	.964	.126	.364	.038	.128
Replacement cost	.124	.187	.211	.142	.162	.083	2.101	.172	.598	.108	4.455
Total fixed costs:											
Book cost	.210	.233	.163	.328	.240	.115	3.807	.259	.884	.137	.198
Standardized cost	.290	.328	.260	.438	.302	.188	4.960	.431	1.376	.186	10.541
Replacement cost	.417	.619	.772	.505	.528	.241	5.407	.608	2.299	.370	16.288
Variable costs:											
Direct labor	.502	.870	.819	.647	.845	.270	.342	.383	1.303	1.242	.275
Administrative overhead	.140	.246	.078	.241	.324	.106	.254	.172	.354	.111	--
Electricity, heat, etc	.059	.074	.056	.101	.071	.027	.102	.119	.264	.086	.140
Drier fuel	--	--	--	--	--	--	--	--	.602	--	--
Truck expense	.016	.011	--	.056	.023	.008	--	--	--	--	--
Building repairs	.007	.003	.002	.004	.004	.014	.329	.006	.005	--	.002
Equipment repairs	.040	.037	.025	.048	.030	.038	.025	.112	.223	.029	.020
Insurance on grain	--	--	--	--	--	--	.150	--	--	--	--
Taxes on grain	--	--	--	--	--	--	.051	--	--	--	--
Fumigation	--	--	--	--	--	--	.172	--	--	--	--
Supplies	.012	.017	.001	.033	.024	.007	.031	.006	.016	.004	.010
Telephone, telegraph	.018	.017	.004	.051	.026	.008	.025	.007	.030	.011	--
Switching and coopering	.007	.052	--	.009	.068	--	--	.002	--	--	--
Protective services	.001	.003	--	.001	.003	--	.005	.004	.001	--	--
Weigh and inspect	.036	.027	--	.025	.036	.054	--	--	--	--	--
Brokers and commission	--	.002	--	--	.003	--	.002	--	--	.003	--
Audit and legal	.004	.005	--	.021	.010	--	.026	.001	.007	--	.025
Other	.067	.053	.028	.145	.082	.101	.138	.028	.070	.021	.128
Interest on working capital	.016	.015	.017	.022	.015	.011	.023	.019	.064	.001	.101
Total variable costs	.925	1.432	1.030	1.404	1.564	.644	1.675	.859	2.939	1.508	.610
Grand total:											
Book cost	1.135	1.665	1.193	1.732	1.804	.759	5.482	1.118	3.823	1.645	.808
Standardized cost	1.215	1.760	1.290	1.842	1.866	.832	6.635	1.290	4.315	1.694	11.151
Replacement cost	1.342	2.051	1.802	1.909	2.092	.885	7.082	1.467	5.238	1.878	16.898

1/ See footnotes, table 17, for explanation of various cost items.

Table 20.--All port terminals: Weighted average cost per bushel, handling and storing grains, United States, fiscal 1964-65

Cost item 1/	Received by--			Loadout by--			Storage	Cleaning	Drying	Handled only	Shelling
	Truck	Rail	Water	Truck	Rail	Water					
	Cents										
Building & equipment insurance	.007	.007	.004	.025	.017	.004	.177	.018	.027	--	--
Building & equipment taxes	.022	.022	.009	.034	.103	.010	.739	.102	.116	.003	--
Licenses & bonds	--	--	--	--	--	--	.037	--	--	--	--
Building & equipment lease	.128	.086	.063	.729	.104	.070	2.678	.451	.747	.665	--
Building & equipment depreciation:											
Book cost	.062	.071	.043	.031	.150	.035	1.174	.231	.205	.070	--
Standardized cost	.063	.080	.036	.028	.198	.034	.877	.242	.149	.087	--
Replacement cost	.279	.235	.094	.301	.460	.142	3.442	.533	.492	.580	--
Interest on investment:											
Book cost	.035	.040	.025	.006	.052	.019	.679	.102	.047	--	--
Standardized cost	.053	.059	.030	.034	.155	.026	1.248	.150	.117	.594	--
Replacement cost	.124	.112	.059	.204	.240	.079	2.819	.431	.298	.247	--
Total fixed costs:											
Book cost	.254	.226	.144	.825	.426	.138	5.484	.904	1.142	.738	--
Standardized cost	.273	.254	.142	.850	.577	.144	5.756	.963	1.156	1.349	--
Replacement cost	.432	.376	.166	.564	.820	.235	7.214	1.084	.933	.830	--
Variable costs:											
Direct labor	.543	.671	.500	.644	.980	.305	.345	.722	.879	2.014	--
Administrative overhead	.081	.101	.094	.107	.154	.074	.095	.079	.096	.359	--
Electricity, heat, etc.	.076	.053	.033	.203	.102	.025	.064	.197	.332	.154	--
Drier fuel	--	--	--	--	--	--	--	--	.558	--	--
Truck expense	.006	.006	.008	.013	.005	.006	--	--	--	--	--
Building repairs	.004	.005	.006	.010	.007	.005	.778	.004	.004	.003	--
Equipment repairs	.116	.056	.036	.310	.075	.026	.031	.212	.320	.070	--
Insurance on grain	--	--	--	--	--	--	.221	--	--	--	--
Taxes on grain	--	--	--	--	--	--	.025	--	--	--	--
Fumigation	--	--	--	--	--	.037	.053	--	--	--	--
Supplies	.004	.006	.005	.003	.025	.005	.010	.006	.010	.006	--
Telephone, telegraph	.004	.003	--	.003	.003	.003	.004	.002	.002	.006	--
Switching and coopering	--	.135	.104	--	.114	.044	--	--	--	--	--
Protective services	.004	.006	.003	.001	.018	.004	.006	.007	.004	.022	--
Weigh and inspect	.025	.043	.054	.099	.045	.042	--	--	--	--	--
Brokers and commission	--	.001	--	--	.003	--	.002	--	--	--	--
Audit and legal	.001	.002	--	.002	--	.004	.002	.003	--	.011	--
Other	.013	.027	.008	.023	.036	.025	.035	.019	.022	.042	--
Interest on working capital	.010	.010	.006	.110	.022	.005	.031	.030	.078	--	--
Total variable costs	.887	1.125	.857	1.528	1.589	.610	1.702	1.281	2.305	2.687	--
Grand total:											
Book cost	1.141	1.351	1.001	2.353	2.015	.748	7.186	2.185	3.447	3.425	--
Standardized cost	1.160	1.379	.999	2.378	2.166	.754	7.458	2.244	3.461	4.036	--
Replacement cost	1.319	1.501	1.023	2.092	2.409	.845	8.916	2.365	3.238	3.517	--

1/ See footnotes, table 17, for explanation of various cost items.

APPENDIX: METHODOLOGY USED

Sampling

The country firms included in the universe were picked at random from a list of approximately 900 facilities qualified under the Uniform Grain Storage Agreement to handle and store Commodity Credit Corporation (CCC) grains during a previous survey concerning the Cost of Insuring Grains in Public Elevators. Data obtained on the 900 plants indicated the type of structure, location, grains handled and stored, and other factors relevant to cost. This sample list was used in order to assure adequate sampling of all relevant cost factors. In arriving at a sampling procedure, the Economic Research Service (ERS) had the assistance of sampling technicians of the Statistical Reporting Service (SRS), U.S. Department of Agriculture. The sampling procedure agreed upon was as follows:

The list of country facilities was divided into two classes: (1) Those classified as entirely "flat," and (2) those classed as a combination of flat and upright, or as entirely upright. In order to provide sufficient coverage, one-third of all facilities in the "flat" group were selected for study. A total of 30 plants were selected from this group. All other plants were sampled at a rate of 1 out of every 5.2, for a total of 138 plants in this group.

Inland terminals were selected at random from a list of 352 elevators supplied by the Agricultural Stabilization and Conservation Service (ASCS) which were considered to be "full-service elevators." 1/ The sampling rate for this group was 1 plant in every 5.2, for a total of 60 plants.

Port terminal facilities were selected from a list provided by ASCS of the 72 elevators eligible to handle and store CCC grains. A total of 30 plants were selected from this list to provide adequate representation of the East, West, Gulf, and Great Lakes areas.

From the original sample of 260 total plants, 252 usable schedules were obtained.

Cost and other data were obtained from each plant by auditors or accountants assigned to ERS from other USDA agencies. Questionnaires were completed

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1/ To be classified as a full-service terminal elevator, the facility must have the following qualifications: Receive, condition, and store grain rapidly, segregating it by quality factor; rapidly and accurately blend and deliver grain of the quality and quantity required on the basis of official weights and grades; ability to rotate and freshen grain stocks by handling substantial quantities of grain other than that owned by CCC; availability of transit privileges and ability to update rail billing; and availability of sufficient rail sidings and rail switching services to provide fast loading and unloading commensurate with the storage capacity, including adequate weighing equipment.

relative to the quantities of grains received, shipped, cleaned, dried, stored, shelled, handled only, and other such services that might have been performed. In addition, accounting and other records of individual firms were studied and data collected on plant and equipment inventories, types of construction, use made of buildings and equipment, and crew organization. All costs pertinent to plant operation were obtained including such items as depreciation, interest, labor, electricity, supplies, home office, and taxes.

Cost data and related volumes handled and stored were summarized and tabulated by plant and area, and for the United States, according to the plan outlined in the following pages.

Standardized Depreciation and Interest

In order to minimize the effects on costs of wide differences among plants in depreciation allowances and interest on investment, data were further summarized using standardized rates as shown in the following rate schedule. Interest allowance on capital investment of 6 percent of half the original acquisition cost was computed for all plants.

STANDARD DEPRECIATION RATE SCHEDULE
(Straight line method)

Buildings:	Percent
Concrete or tile upright-flat silos elevator	2.5
Metal--tanks-silos-Butlers flat	4.0
Wood--cribbed-"Ironclad"	5.0
Office building-masonry-steel-wood	4.0
Elevator machinery and equipment	8.0
Office furniture and equipment	8.0
Concrete building, machinery and equipment	4.2
Metal building, machinery and equipment	5.3
Wood building, machinery and equipment	6.0
Depreciable land improvement	4.0
Well	4.0
Driveway	4.0
Fence	4.0
Railroad siding and trackage	4.0
Parking lot, etc.	4.0

Replacement Costs

As a basis for estimating rates that might prevail under free competitive conditions and for deriving rates required to induce new investment or reinvestment in the industry, plant replacement values based on original cost were computed and used as a basis for computation of depreciation charges. Original costs were updated to 1964 building costs using the latest edition of Boeckh's Building Cost Indexes. In Boeckh's Building Cost Indexes, the date of the original cost represents an index value of the items under which the original

cost was created. Therefore, to convert the original cost of a particular unit of construction to 1964 costs, the percentage differential between the two indexes (1964 index value and the index of the original cost) was determined and the original cost was multiplied by the index differential. Table 21 shows the differentials used to compute replacement costs by years and types of construction. For example, assume a small concrete elevator cost $90,000 to build in 1956. The index factor to bring this cost up to 1964 costs is shown in table 21 under the brick and concrete column. This index factor (1.279), when multiplied by the original cost of $90,000, gives a 1964 replacement cost value of $115,110. The same procedure was used to update machinery and equipment costs.

Information obtained from construction companies, newly built facilities, mill supply companies, and from USDA files relative to specific "types" of plants was used to check the validity of these calculations.

Replacement costs computed by this method were then used to calculate depreciation charges applicable to individual plants. Uniform rates as shown in the depreciation rate schedule above were used as a basis for estimating depreciation costs applicable to machinery, equipment, and buildings. Allocation to functions was made according to the plan outlined in the next section.

Table 21.--Indexes of 1964 building cost factors used to calculate facility replacement costs, by years 1913-64

Year	Frame	Steel	Brick and wood	Brick and steel	Brick and concrete	Machinery and equipment
			Factor			
1913	5.673	5.096	6.039	6.071	6.705	5.917
1914	5.632	5.435	6.062	6.267	6.729	--
1915	5.485	5.300	5.928	6.124	6.537	--
1916	5.179	4.063	5.446	5.083	5.818	--
1917	4.436	3.110	4.636	4.085	4.992	--
1918	3.777	3.126	3.899	3.839	4.397	--
1919	3.242	3.080	3.354	3.590	3.916	--
1920	2.511	2.630	2.606	2.919	3.099	--
1921	3.179	3.260	3.197	3.550	3.625	--
1922	3.455	3.504	3.459	3.822	3.891	3.626
1923	3.062	3.116	3.122	3.425	3.520	--
1924	3.129	3.166	3.122	3.415	3.480	--
1925	3.148	3.172	3.178	3.439	3.483	--
1926	3.107	3.132	3.162	3.418	3.483	--
1927	3.138	3.188	3.210	3.442	3.507	--
1928	3.141	3.182	3.181	3.449	3.520	--
1929	2.964	3.135	3.089	3.375	3.460	--
1930	3.059	3.163	3.175	3.395	3.467	3.253
1931	3.313	3.403	3.429	3.654	3.755	3.513
1932	3.987	3.774	4.006	4.208	4.424	4.079
1933	4.008	3.623	3.981	4.066	4.239	3.982
1934	3.768	3.421	3.531	3.740	3.834	3.659
1935	3.865	3.451	3.631	3.772	3.854	3.712
1936	3.698	3.349	3.539	3.650	3.752	3.596
1937	3.275	2.985	3.197	3.262	3.405	3.225
1938	3.186	2.872	3.107	3.134	3.254	3.111
1939	3.114	2.885	3.060	3.120	3.225	3.082
1940	2.995	2.864	2.989	3.089	3.200	3.029
1941	2.712	2.784	2.833	2.981	3.120	2.750
1942	2.570	2.672	2.700	2.841	2.964	2.750
1943	2.443	2.596	2.585	2.743	2.855	2.645
1944	2.232	2.458	2.405	2.598	2.717	2.480
1945	2.086	2.352	2.236	2.461	2.566	2.330
1946	1.905	2.197	2.025	2.259	2.342	2.412
1947	1.558	1.922	1.700	1.950	2.037	1.824
1948	1.383	1.693	1.513	1.729	1.793	1.615
1949	1.444	1.629	1.516	1.676	1.728	1.597
1950	1.364	1.567	1.446	1.609	1.670	1.528
1951	1.269	1.454	1.338	1.492	1.558	1.420
1952	1.239	1.398	1.298	1.434	1.491	1.371
1953	1.222	1.337	1.267	1.375	1.418	1.324
1954	1.240	1.307	1.264	1.346	1.386	1.310
1955	1.200	1.258	1.231	1.300	1.343	1.267
1956	1.151	1.182	1.175	1.231	1.279	1.205
1957	1.135	1.122	1.144	1.179	1.230	1.163
1958	1.127	1.094	1.129	1.147	1.194	1.139
1959	1.088	1.060	1.096	1.107	1.149	1.101
1960	1.071	1.053	1.076	1.089	1.120	1.083
1961	1.071	1.057	1.068	1.078	1.093	1.074
1962	1.053	1.040	1.049	1.054	1.062	1.052
1963	1.030	1.022	1.028	1.030	1.033	1.029
1964	1.000	1.000	1.000	1.000	1.000	1.000

Method of Allocation

Allocation of cost items to functions was made in a uniform manner according to the following plan:

A. Fixed Costs:

1. Building Depreciation: Based on estimates obtained from warehouse operators, the total capacity of each warehouse was divided between storage capacity and working capacity, i.e., capacity needed for receiving, shipping, cleaning, drying, turning, etc. The ratio of storage capacity and working capacity to total capacity was used as a basis for determining the amount of depreciation costs to be allocated directly to the storage function and other functions. For example, assume the operator estimated that 90 percent of his plant was used entirely for storage and 10 percent was needed for handling operations. In this case, 90 percent of the total depreciation chargeable to the operation would be allocated directly to the storage operation. The remaining 10 percent would then be allocated to all functions including storage, based on the volume handled in each function. The additional proportion of cost allocated to storage was based on the volume of grain turned during the survey period.

2. Equipment Depreciation: Costs for equipment which could be identified with a particular function were allocated directly. For example, costs for such items of equipment as automatic railcar unloaders, driers, hot-spot detection systems, etc., that are used for only one purpose, were allocated directly to the applicable function. Those items of equipment which could be identified but could not be allocated to a specific function were allocated based on the volume of grain involved. For instance, many items could be identified as being used in receiving operations but could not be identified as equipment used specifically in truck receiving or rail receiving. In this case, the ratio between truck and rail receipts was used as a basis for allocating these costs to truck and rail receiving, respectively.

   Hours of operation were used for all equipment which could not be identified as outlined above. This equipment generally consisted of the legs, conveyor systems, trippers, and other equipment that might be used in more than one function, i.e., receiving, shipping, drying, turning, cleaning, etc.

3. Insurance: Building insurance was allocated to functions in the same manner as depreciation in item 1. Insurance on machinery and equipment was allocated to functions based on the hours of use.

4. Taxes: This cost was allocated in the same manner as insurance (item 3).

5. Licenses and Bonds: All to storage.

6. Leases and Rentals: Building leases were allocated to functions in the same manner as building depreciation (item 1). Leases of equipment were allocated in the same manner as equipment depreciation (item 2).

7. Interest on Capital Investment: Allocation of interest on building investment was made in the same manner as depreciation cost (item 1), and interest on investment in equipment in the same manner as equipment depreciation (item 2).

B. Variable Costs:

8. Direct Labor: Allocation to functions was based on time studies made at plants in 1963, plant records, and estimates made by management for secondary functions such as cleaning, drying, and handling only.

9. Administrative Overhead: Home office costs, both clerical and management, are included in this item. Allocation to functions was based on estimates furnished by warehouse operators and owners. Volume guides were used as a basis for distribution of costs within a specific function, i.e., as to distribute receiving costs between receiving by truck and by rail.

10. Electricity: Allocation was based on the hours required to handle the volume of grain involved in a specific operation. For plants with aeration equipment, an additional $5 per each 10,000 bushels stored was allocated to storage.

11. Drier Fuel: All allocated to drying.

12. Truck Expense: Allocation based on volume of receipts and shipments.

13. Building Repairs: Allocated on the same basis as depreciation costs in item 1.

14. Equipment Repairs: Allocated on the same basis as depreciation costs in item 2.

15. Insurance on Grain: In all cases except where special coverage was taken, grain insurance was allocated to storage.

16. Taxes on Grain: All to storage.

17. Fumigation: All costs for this item were charged to storage except in port terminals where a proportion was allocated to water shipments.

18. Supplies: Volume handled in each function.

19. Telephone and Telegraph: Volume handled in each function.

20. Switching and Coopering: Switching based on the volume received and shipped by rail. All coopering was allocated to loadout by rail. Includes other miscellaneous transportation expenses allocated direct.

21. Protective Services: Volume handled in each function.

22. Weigh and Inspect: Volume received and shipped.

23. Brokers and Commissions: Volume handled in each function.

24. Audit and Legal: Volume handled in each function.

25. Other: Volume handled in each function.

26. Interest on Working Capital: Allocated based on total of the "out-of-pocket cost" applicable to each function.

Estimates of Demand for Storage Space

Quantity of grain production sold off-farms for 1966 was estimated to equal the average for the last 5 years. Total feed grain demand for livestock was derived by using Economic Research Service projections of livestock animal units for 1966 and average grain consumption per animal unit. Food and industrial demand for feed grains was also obtained from Economic Research Service projections. Wheat demand was estimated using per capita consumption patterns for wheat from an Agricultural Research Service report, "Utilization of Wheat and Food," and the July 1965 population estimates from the U.S. Bureau of the Census. Oilseed demand was estimated from published Census and ERS reports. Grain exports were projected from Consumer and Marketing Service and Economic Research Service export data for the past 2 years. Off-farm grain stocks on January 1, 1966, as reported by Statistical Reporting Service in "Stocks of Grain," were used as beginning inventories. Flour milling capacity data were derived from the Northwestern Miller publication. Flour milling costs were estimated from secondary sources.

Estimates of the maximum demand for storage space needed in 1966 were based on beginning inventories January 1, 1966, as outlined above, and the amount of space available for storage after adjustments for necessary working space. Costs associated with a particular demand were adjusted to eliminate depreciation, interest on investment, and leases.

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