

L E A D A N D Z I N C I N D U S T R Y

STATISTICS FOR 1967 COMPARED WITH OTHER YEARS

ARIZONA, UNITED STATES AND WORLD

ARIZONA DEPARTMENT OF MINERAL RESOURCES

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L E A D I N D U S T R Y

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L E A D

PHYSICAL PROPERTIES *

Lead is one of the most important industrial nonferrous metals used in substantial quantities in the metallic form; it is also important for the properties it imparts to its alloys.

Is the softest and heaviest of the common metals. It can be rolled to a foil of less than 0.0005 inches in thickness but is not ductile enough to be drawn into fine wire. Very malleable. Lead cannot be hardened except by alloying.

Some of the physical properties of lead are as follows;

Symbol - Pb. Atomic Weight - 207.21. Spec. Gravity - 11.34

Melting Point - 327.35°C (621.2°F). Boiling Point 1,740°C (3164°F)

Specific Resistance (20°-40°C) (68° - 104°F) - Microhm 20.65

Hardness (Mohs' scale) - 1.5. Tensile Strength #/sq. in. - 3,000

Crystal Structure - Face-centered Cubic Valences - +4 & +2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

Arizona Department of Mineral Resources

METAL DUTIES ON LEAD*

As of December 31, 1967

According to the Tariff Classification Act of 1962, Amended.

Published in American Bureau of Metal Statistics Yearbook, 1967 page 147

As follows:

Lead:

Lead-bearing ores and other lead-bearing materials, dutiable lead content	0.75¢ lb.
Lead dross, dutiable lead content	1.0625¢ lb.
Lead bullion, lead waste and scrap on 99.6% of lead content	1.0625¢ lb.
Refined lead in unwrought forms, Babbitt metal and solder, type metal and antimonial lead, lead content	1.0625¢ lb.
Lead pipe, sheets, glaziers' lead and lead wire	1.3125¢ lb.

* The Kennedy Round of Geneva trade agreements was signed June 30, 1967. Tariffs on lead were not cut.

REVIEW OF LEAD INDUSTRY - 1967

Mine production of recoverable lead in the United States at 316,931 short tons registered a 3.2 percent decrease in 1967 as compared to the previous year and its value at \$88.741 million was 10.3 percent lower than the 1966 figure. The U. S. Bureau of Mines reported that production's upward trend, which was initiated in 1963, was maintained for the first six months of 1967, but declined in the last half of the year. Strikes at primary lead smelters and refineries, which began July 1st, reduced metal output and also the output of ores and concentrates at many mines dependent on the smelters.

CONSUMPTION

Reported lead consumption was 1.261 million tons, some 5 percent below the record 1.324 million tons of the previous year. The decrease applied to all types of lead and to all product categories except chemicals.

The two major uses of lead; batteries and gasoline antiknock compounds, required almost 57 percent of the total lead consumed in 1967. Ammunition needs ranked third, supplanting red lead and litharge requirements for the first time.

The use of lead in antiknock compounds had registered significant gains from 1962 to 1966. However; the gain of only 291 tons in 1967 reflected a decreased lead content per gallon of gasoline which offset much of the increased production and also reflected a declining export market for these gasoline additives. Future growth will depend on increased gasoline consumption and the extent to which gasoline refining is extended toward higher octane ratings and lower lead content to combat air pollution.

Lead needed in 1967 for collapsible tubes, foil, plumbing, white lead, and pigments remained practically unchanged from the previous year. Lead consumption for calking, solder, red lead, and litharge was considerably lower than in 1966.

FOREIGN TRADE

General imports of ore and bullion decreased 15 percent during the year, due mainly to strike closures of domestic smelters relying on foreign ores. General imports of metal, however, posted a 29 percent increase over 1966.

Four countries, Australia, Bolivia, Canada, and Mexico contributed 93 percent of the lead ore imports. Peru was the leading metal supplier with 19 percent of the total followed by Mexico, Australia, West Germany, Canada, and Yugoslavia. Of special note was the approximately 90,000 tons of metal received from European smelting centers, Belgium-Luxembourg, West Germany and United Kingdom, in comparison with the 21,100 tons in 1966. This reflects in part the movement of free world surplus stocks which moved to the United States to compensate for the strike-curtailed domestic output.

TABLE I

SALIENT U. S. LEAD STATISTICS FOR 1966 and 1967

ARIZONA, UNITED STATES AND WORLD MINE PRODUCTION OF RECOVERABLE LEAD

	Unit: Short Tons	
	Year 1966	Year 1967
Producers' Stocks Beginning of Period	83,443	115,473
U. S. Mine Production Recoverable Lead	327,368	316,931
Secondary Lead Recovered from Old & New Scrap	572,834	553,772
Imported Lead in Ore & Matte, Base Bullion	r 146,003	124,819
Imported Lead in Pigs, Bars	288,821	373,887
Imported Lead in Reclaimed Scrap, etc.	3,956	9,368
TOTAL SUPPLY	r 1,422,425	1,494,250
Exported Lead in Ore, Matte & Base Bullion	N.A.	N.A.
Exported Lead in Pigs and Bars	5,435	6,536
Exported Lead in Scrap	498	394
Producers' Stocks at End of Period	115,473	125,479
Sub-Total	121,406	132,409
NET APPARENT CONSUMPTION	r 1,301,019	1,361,841
REPORTED CONSUMPTION	1,323,877	1,260,516
UNACCOUNTED FOR (Stockpiles, etc.)	r -22,858	+101,325
PRODUCTION OF REFINED PRIMARY LEAD:		
From Domestic Ores & Base Bullion	318,646	258,507
From Foreign Ores & Base Bullion	122,089	121,387
ARIZONA MINE PRODUCTION	5,211	4,771
WORLD MINE PRODUCTION	r 3,131,095	3,132,887
U.S. MINE PRODUCTION AS % OF REPORTED CONSUMPTION	24.73%	25.14%
MINE PRODUCTION & SECONDARY AS % OF REPORTED CONSUMPTION	68.00%	69.08%
Avg. Price of Lead - N.Y. (E&MJ)	15.12¢	14.00¢
Avg. Price of Lead - London	11.87¢	10.28¢

r Revised

N.A. Not Available

Source: U.S. Bureau of Mines

TABLE II

MINE PRODUCTION OF RECOVERABLE LEAD IN THE UNITED STATES, BY STATES

	Short Tons		
	1965	1966	1967
Arizona	5,913	5,211	4,771
California	1,810	1,976	1,735
Colorado	22,495	23,082	21,923
Idaho	66,606	72,334	61,387
Illinois	3,005	2,285	2,384
Kansas	1,644	1,109	1,031
Kentucky	756	484	845
Missouri	133,521	132,255	152,649
Montana	6,981	4,409	898
Nevada	2,277	3,581	1,500
New Mexico	3,387	1,596	1,827
New York	601	1,097	1,653
Oklahoma	2,813	2,999	2,727
Utah	37,700	64,124	53,813
Virginia	3,651	3,078	3,430
Washington	6,328	5,859	2,762
Wisconsin	1,645	1,694	1,596
Other States	14	195	- -
TOTAL	301,147	327,368	316,931

Source: U.S. Bureau of Mines 1965, 1966 and 1967

TABLE III
WORLD MINE PRODUCTION OF LEAD, (CONTENT OF ORE), BY COUNTRIES 1/
IN THOUSAND SHORT TONS

Year	U.S.A. <u>2/</u>	MEXICO	CANADA	PERU	AUSTRALIA	REST OF FREE WORLD	TOTAL FREE WORLD	SOVIET SPHERE <u>3/</u>	TOTAL WORLD (Estimated)
1955	338	232	<u>2/</u> 203	131	331	783	2,018	412	2,430
1956	353	220	<u>2/</u> 189	142	335	r 778	r 2,017	r 473	2,490
1957	338	237	<u>2/</u> 181	151	373	r 829	r 2,109	r 531	r 2,640
1958	267	223	r <u>2/</u> 187	148	r 367	r 825	r 2,017	r 573	r 2,590
1959	256	210	<u>2/</u> 187	<u>2/</u> 127	354	r 809	r 1,943	r 627	r 2,570
1960	247	210	r <u>2/</u> 206	r <u>2/</u> 145	r 345	r 811	r 1,964	r 656	r 2,620
1961	262	200	r 183	r <u>2/</u> 150	r 302	r 840	r 1,937	r 703	r 2,640
1962	237	213	211	r <u>2/</u> 141	r 415	r 820	r 2,037	r 728	2,765
1963	253	209	199	r <u>2/</u> 164	r 460	r 796	r 2,081	r 694	r 2,775
1964	286	r 193	206	r <u>2/</u> 166	420	r 800	r 2,071	r 718	r 2,789
1965	301	187	303	<u>2/</u> 170	406	r 849	r 2,216	r 761	r 2,977
1966	327	e 197	r 323	<u>2/</u> 160	r 409	r 893	r 2,309	r 822	r 3,131
1967p	317	e 189	340	<u>2/</u> 174	417	864	2,301	832	3,133

e Estimate p Preliminary r Revised

1/ U.S. Bureau of Mines, 2/ Recoverable, 3/ Some smelter production included in data.

MINE PRODUCTION OF LEAD, (CONTENT OF ORE), SOVIET SPHERE 1/
IN THOUSAND SHORT TONS

COUNTRIES	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967p
BULGARIA	53	64	70	e 78	89	92	88	104	98	101	e 110	e 110	e 112
CHINA MAINLAND e	32	40	45	55	77	88	99	99	110	110	110	110	99
CZECHOSLOVAKIA e	6	7	7	7	7	7	7	15	15	15	15	15	15
GERMANY, EAST e	7	7	8	8	8	8	8	8	11	11	11	r 13	NA
HUNGARY	-	-	-	-	-	-	1	1	1	1	2	e 2	NA
KOREA, NORTH e	9	16	45	45	44	55	55	55	55	60	65	65	72
POLAND	<u>2/</u> 38	36	33	37	39	43	42	42	43	42	45	r 50	e 50
RUMANIA e <u>2/</u>	12	13	13	13	13	13	13	14	14	14	r 17	r 44	44
U.S.S.R e	<u>2/</u> 255	<u>2/</u> 290	310	330	<u>2/</u> 350	<u>2/</u> 350	<u>2/</u> 390	<u>2/</u> 390	r 347	r 364	r 386	r 413	440
TOTAL e	412	473	531	573	627	656	703	728	694	718	761	822	832

e Estimate p Preliminary, r Revised NA Not Available 1/ U. S. Bureau of Mines 2/ Smelter production.

TABLE IV

TOTAL LEAD IMPORTED INTO THE UNITED STATES, AND EXPORTED FROM U. S.

Short Tons			
	Imports	Exports	Net Imports
Avg. 1948-1952	434,909	3,500	431,409
1953	552,278	4,547	547,731
1954	443,243	4,592	438,651
1955	r 441,402	4,720	r 436,682
1956	r 481,655	7,819	r 473,836
1957	r 569,842	6,130	r 563,712
1958	r 601,044	3,386	r 597,658
1959	r 410,697	4,121	r 406,576
1960	359,656	5,843	353,813
1961	409,402	11,733	397,669
1962	r 402,752	7,467	r 395,285
1963	389,081	3,513	385,568
1964	340,993	23,342	317,651
1965	350,110	11,604	338,506
1966	434,824	5,933	428,891
1967	498,706	6,930	491,776

TABLE V

CONSUMPTION OF LEAD IN UNITED STATES

Short Tons						
Year	Metal Products	Storage Batteries	Pigments	Tetra-ethyl Lead	Other Uses	TOTAL
1957	448,948	361,015	115,361	177,001	35,790	1,138,115
1958	382,822	312,725	95,901	159,412	35,527	986,387
1959	407,520	380,732	103,671	160,020	39,206	1,091,149
1960	369,731	353,196	98,541	163,826	35,878	1,021,172
1961	359,302	367,998	94,824	169,802	35,290	1,027,216
1962	380,623	419,906	102,968	163,926	37,212	1,109,635
1963	396,797	439,081	99,075	192,811	35,594	1,163,358
1964	r 406,523	r 429,348	r 103,636	223,466	r 39,165	1,202,138
1965	410,344	455,347	108,883	r 225,203	r 41,705	1,241,482
1966	440,117	472,492	r 119,888	r 246,879	r 44,501	1,323,877
1967	404,104	466,665	103,190	247,170	39,387	1,260,516

r Revised

Source: U. S. Bureau of Mines

TABLE VI

U. S. LEAD CONSUMPTION - YEARS 1965, 1966 & 1967

	Short Tons		
	1965	1966	1967
Metal Products:			
Ammunition	57,322	78,345	78,766
Bearing Metals	21,600	21,588	19,561
Brass and Bronze	23,699	25,447	20,467
Cable Covering	59,645	66,491	63,037
Calking Lead	66,584	63,250	48,789
Casting Metals	5,046	6,671	10,083
Collapsible Tubes	10,893	11,987	11,299
Foil	4,805	6,041	6,148
Pipes, traps and bends	19,837	19,984	20,184
Sheet Lead	27,569	28,938	26,763
Solder	77,819	78,898	68,833
Storage Battery Grids, Posts, etc	235,641	240,535	229,287
Storage Battery Oxides	219,706	231,957	237,378
Terne Metal	2,109	1,966	1,620
Type Metal	33,416	30,421	28,554
TOTAL	865,691	912,609	870,769
Pigments:			
White Lead	8,414	8,131	8,087
Red Lead & Litharge	79,853	89,500	76,589
Pigment Colors	12,553	13,695	13,041
Other ^{1/}	8,063	8,562	5,473
TOTAL	108,883	119,888	103,190
Chemicals:			
Tetraethyl Lead	225,203	246,879	247,170
Miscellaneous	346	614	609
TOTAL	225,549	247,493	247,779
Miscellaneous Uses:			
Annealing	5,719	5,441	4,202
Galvanizing	1,775	1,639	1,854
Lead Plating	240	428	532
Weights & Ballast	14,135	18,090	15,794
TOTAL	21,869	25,598	22,382
Other Uses, Unclassified	19,490	18,289	16,396
TOTAL REPORTED ^{2/}	1,241,482	1,323,877	1,260,516

^{1/} Includes lead content of leaded zinc oxide production.

^{2/} Includes lead content of scrap used directly in fabricated products.

Source: U. S. Bureau of Mines

TABLE VII

IMPORTS AND EXPORTS OF LEAD INTO AND FROM UNITED STATES

YEARS 1965, 1966 and 1967

Country of Origin	Short Tons		
	1965	1966	1967
Ore, Matte, etc. (Lead Content)	122,661	143,991	124,067
Canada	43,622	52,707	33,474
Mexico	760	624	314
Guatemala	18	35	197
Honduras	8,712	11,132	6,513
Colombia	677	445	561
Peru	26,419	41,610	36,734
Bolivia	5,096	11,136	13,764
Republic of South Africa	10,570	1,394	359
Australia	26,658	22,614	25,553
Other Countries	129	2,294	6,598
Base Bullion	566	2,012	752
Australia - Oceania	448	1,283	- -
South America	25	- -	66
North America	93	609	118
Other Countries	- -	120	568
Pigs and Bars (Lead Content)	r 222,613	285,389	363,598
Canada	31,697	34,283	37,238
Mexico	73,546	75,294	57,271
Peru	26,132	51,593	70,377
Belgium-Luxembourg	197	2,535	23,281
West Germany	1,653	15,499	49,077
United Kingdom	514	3,101	17,680
Yugoslavia	28,640	31,322	30,478
Australia	51,105	44,187	53,156
Other Countries	r 9,129	r 27,575	25,040
Reclaimed Scrap, etc.	4,270	3,432	10,289
GRAND TOTAL IMPORTS	r 350,110	434,824	498,706
GRAND TOTAL EXPORTS	11,604	5,933	6,930
EXCESS IMPORTS	r 338,506	428,891	491,776
r Revised			

Source: U. S. Bureau of Mines

Z I N C I N D U S T R Y

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Z I N C

PHYSICAL PROPERTIES *

Zinc is a bluish white, hard, brittle metal with a microscopic crystalline structure when broken. The commercial metal is now known in the U. S. as slab zinc, rather than by the older term spelter.

The commercial importance of zinc is based largely upon its properties as a corrosion inhibitor especially as a protective coating on steel in galvanized products and upon its use in alloys. On account of low strength and brittleness, the pure metal, when used alone, has few uses except as sheet metal and other rolled forms.

Zinc compounds are important as pigments, fillers, and chemicals, with a wide range of end uses.

Symbol - Zn. Atomic Weight - 65.38 Specific Gravity - 7.13

Melting Point - °F - 787.03. Boiling Point, °F - 1,663

Electrical Resistivity - Microhm per c.c. - 5.916

Tensile Strength, cast, Lb. per sq. in. - 9,000. Rolled - 21,000

Crystal Structure - close packed hexagonal. Valence - 2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

Arizona Department of Mineral Resources

METAL DUTIES ON ZINC*

As of December 31, 1967

According to the Tariff Classification Act of 1962, Amended.

Published in American Bureau of Metal Statistics Yearbook, 1967, page 147

As follows:

Zinc:

Zinc-bearing ores and other zinc-bearing materials, dutiable zinc content	0.67¢ lb.
Zinc waste and scrap and zinc dross and skimmings	0.75¢ lb.
Refined zinc in unwrought forms and zinc dust	0.70¢ lb.
Zinc sheets, rolled and cross rolled	1.0¢ lb.
Zinc sheets, rolled and cross rolled, coated or plated with metal	1.125¢ lb.
Zinc sheets, rolled in one direction only19.%
Zinc oxide and leaded zinc oxide containing not over 25% of lead by weight:	
Dry	0.6¢ lb.
Other	1.0¢ lb.

* The Kennedy Round of Geneva trade agreements was signed June 30, 1967. Tariffs on zinc were not cut.

REVIEW OF THE ZINC INDUSTRY - 1967

The 1967 U. S. mine production of recoverable zinc was 549,413 short tons. Although down slightly from the recent past, current production was higher than for any year between 1952 and 1964. The 1967 Minerals Yearbook of the U. S. Bureau of Mines reported that 58 percent of this total output came from states east of the Mississippi River, 38 percent from Western states and 4 percent from West Central states.

U. S. smelter production of slab zinc in 1967 was down 9 percent from the previous year. Roughly 7 percent of the total was derived from scrap sources, 50 percent from foreign ores, and the proportion of slab zinc derived from domestic ores declined to about 43 percent, where it stood early in the decade. A comparative table of sources of U. S. slab zinc production follows:

Sources for U. S. Slab Zinc Production
(In 000's of Short Tons)

Year	From Domestic Ores	Percent of Total	From Foreign Ores	Percent of Total	From Scrap	Percent of Total	Total Tonnage
1960	334	38.5	465	53.6	69	7.9	868
1961	413	45.8	434	48.1	55	6.1	902
1962	448	47.8	431	45.9	59	6.3	938
1963	474	49.7	419	44.0	60	6.3	953
1964	532	51.9	422	41.1	72	7.0	1,026
1965	551	51.2	443	41.1	83	7.7	1,077
1966	524	47.3	501	45.2	83	7.5	1,108
1967	439	43.3	500	49.4	74	7.3	1,013*

* Total variation due to rounding.

C O N S U M P T I O N

U. S. consumption of slab zinc at 1.24 million tons was 12 percent below the like 1966 figure which represented a reversal of the upward trend of the preceding 6 years. Zinc base alloys continued to consume the largest amount followed by galvanizing, brass products, rolled zinc, zinc oxide and other uses. Of the

Continued

galvanizing component of consumption, usage for sheet and strip covering ranked first, followed by tubes and pipe coatings, wire rope protection, and other items.

S T O C K S

Stocks of slab zinc at producer's plants were higher by some 26 percent at year end while consumers' plant stocks declined about 20 percent. The changes reflected the extensive work stoppages during the U. S. mining industry strike in the second half of 1967.

P R I C E S

Prime Western grade zinc at East St. Louis was quoted at 14.5 cents per pound at the start of 1967. From May 2nd through June 19th, the market had dual quotations of 13.50 and 13.75 cents per pound, after which it remained at 13.5 cents until the end of the year.

F O R E I G N T R A D E

In 1967, general imports included 222,112 tons of zinc (in metal) and 534,092 tons (content) of ore. The metal imports were reduced from 1966 but were the second largest since 1943.

Exports of slab zinc increased 12-fold in 1967 to 16,809 tons, a reversal of the declining trend of the previous years.

TABLE I

STATISTICS OF THE UNITED STATES ZINC INDUSTRY

Unit: Short Tons

	1966	1967
Stocks of Slab Zinc at Start of Period:		
Producers	28,622	64,798
Consumers	<u>150,763</u>	<u>129,593</u>
Sub-Total	<u>179,385</u>	<u>194,391</u>
Production:		
Smelter, Slab Zinc, from		
Domestic Ores	523,580	438,553
Foreign Ores	501,486	500,277
Redistilled Secondary (Slab Zinc from Scrap)	<u>83,263</u>	<u>73,505</u>
Sub-Total	<u>1,108,329</u>	<u>1,012,335</u>
Imports: Slab Zinc	<u>278,175</u>	<u>222,112</u>
GRAND TOTAL	<u>1,565,889</u>	<u>1,428,838</u>
Exports - Slab, Pigs, Blocks	<u>1,406</u>	<u>16,809</u>
Stocks of Slab Zinc, end of Period		
Producers	64,798	81,916
Consumers	r <u>129,593</u>	<u>102,456</u>
Sub-Total	r <u>194,391</u>	<u>184,372</u>
Apparent Consumption	r <u>1,370,092</u>	<u>1,227,657</u>
Reported Consumption		
Slab Zinc	1,410,197	1,236,808
Consumed directly in ores	<u>126,696</u>	<u>114,301</u>
TOTAL	1,536,893	1,351,109

r Revised

Source: U. S. Bureau of Mines

T A B L E I I

MINE PRODUCTION OF RECOVERABLE ZINC, BY STATES, IN 1965-1967

STATE	Short Tons		
	1965	1966	1967
Arizona	21,757	15,985	14,330
California	225	335	441
Colorado	53,870	54,822	52,442
Idaho	58,034	60,997	56,528
Illinois	18,314	15,192	20,416
Kansas	6,508	4,769	4,765
Kentucky	5,654	6,586	6,317
Missouri	4,312	3,968	7,430
Montana	33,786	29,120	3,341
Nevada	3,858	5,827	3,035
New Jersey	38,297	25,237	26,041
New Mexico	36,460	29,296	21,380
New York	69,880	73,454	70,555
Oklahoma	12,715	11,237	10,670
Pennsylvania	27,635	28,080	35,067
Tennessee	122,387	103,117	113,065
Utah	27,747	37,323	34,251
Virginia	20,491	17,666	18,846
Washington	22,230	24,772	21,540
Wisconsin	26,993	24,775	28,953
TOTAL	611,153	572,558	549,413

Source: U. S. Bureau of Mines

TABLE III
WORLD MINE PRODUCTION OF ZINC, (Content of Ore) By COUNTRIES 1/
In Thousand Short Tons

Year	U.S.A. <u>2/</u>	Canada	Mexico	Peru	Italy	Australia	Rest of Free World	Total Free World	Soviet Sphere	Total World (Estimated)
1955	515	<u>2/</u> 433	297	183	132	287	841	r 2,688	r 512	r 3,200
1956	542	<u>2/</u> 422	274	193	r 138	r 311	932	r 2,812	r 618	r 3,430
1957	532	<u>2/</u> 414	268	170	r 143	r 327	959	r 2,813	r 657	r 3,470
1958	412	<u>2/</u> 425	247	r 149	151	295	981	r 2,660	r 710	r 3,370
1959	425	<u>2/</u> 396	291	<u>2/</u> 158	r 146	r 308	954	r 2,678	r 762	r 3,440
1960	435	<u>2/</u> 407	289	<u>2/</u> 196	r 144	r 355	1,002	r 2,828	r 852	r 3,680
1961	464	r 443	296	<u>2/</u> 192	r 150	r 349	1,055	r 2,949	r 896	r 3,845
1962	505	502	r 277	<u>2/</u> 179	r 144	r 378	1,045	r 3,030	r 900	r 3,930
1963	529	497	r 264	<u>2/</u> 215	r 118	394	1,119	r 3,136	r 900	r 4,036
1964	575	730	r 260	<u>2/</u> 261	r 122	r 386	1,158	r 3,492	r 941	r 4,433
1965	611	r 911	r 248	<u>2/</u> 281	127	r 391	1,181	r 3,750	r 1,001	r 4,751
1966	573	r 1,047	r 242	<u>2/</u> 284	r 128	r 414	1,224	r 3,912	r 1,048	r 4,960
1967 _p	549	1,249	318	<u>2/</u> 350	136	446	993	r 4,041	1,134	5,175

e Estimate p Preliminary r Revised 1/ U.S. Bureau of Mines 2/ Recoverable.

MINE PRODUCTION OF ZINC, (Content of Ore) SOVIET SPHERE 1/ 2/

	In Thousand Short Tons												
	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967 _p
Bulgaria	35	39	50	67	76	85	82	r 69	64	71	73	er 90	e 90
China, Mainland e	31	39	44	50	70	88	110	110	110	110	110	110	100
Germany, East e	8	8	8	8	8	8	8	8	r 11	r 11	r 11	r 13	13
Hungary	-	-	-	-	-	2	2	3	3	3	4	e 4	NA
Korea, North e	39	55	80	90	95	95	100	100	110	110	115	115	125
Poland	139	167	145	135	143	159	154	160	r 162	r 166	r 168	r 166	216
U.S.S.R e <u>3/</u>	<u>4/</u> 260	<u>4/</u> 310	<u>4/</u> 330	<u>4/</u> 360	370	415	440	450	r 440	r 470	r 520	r 550	590
Total	r 512	r 618	r 657	r 710	r 762	r 852	r 896	r 900	r 900	r 941	r 1,001	r 1,048	1,134

e Estimate p Preliminary r Revised NA Not Available
1/ U. S. Bureau of Mines 2/ Czechoslovakia produces concentrate for export, and North Vietnam and Rumania also produce zinc, but no data are available. 3/ Recoverable 4/ Smelter production.

TABLE IV

TOTAL ZINC IMPORTED INTO UNITED STATES, AND EXPORTED FROM U. S.

Year	Short Tons				
	IMPORTS			EXPORTS	
	ORES	Blocks, Pigs or Slabs	TOTAL	Slabs, Pigs or Blocks	NET IMPORTS
1955	478,044	195,696	673,740	18,069	655,671
1956	525,350	244,978	770,328	8,813	761,515
1957	526,014	269,007	795,021	10,785	784,236
1958	r 461,560	195,199	r 656,759	r 2,073	r 654,686
1959	r 500,115	r 156,963	r 657,078	r 11,629	r 645,449
1960	r 457,155	120,767	r 577,922	75,144	r 502,778
1961	r 415,700	r 127,562	r 543,262	r 50,055	r 493,207
1962	r 467,398	r 141,957	r 609,355	36,102	r 573,253
1963	372,769	144,757	517,526	33,853	483,673
1964	357,145	118,340	475,485	26,515	448,970
1965	428,040	152,990	581,030	5,939	1/ 575,091
1966	521,320	278,175	799,495	1,406	2/ 798,089
1967	534,092	222,112	756,204	16,809	3/ 739,395

1/ 28.1% Increase over 1964; 2/ 38.8% Increase over 1965; 3/ 7.4% Decrease from 1966.

TABLE V

CONSUMPTION OF SLAB ZINC IN UNITED STATES

Year	Short Tons						
	Galvan- izing	Brass Products	Zinc Base Alloy	Rolled Zinc	Zinc Oxide	Other Uses	Total Con- sumption
1950	441,686	139,373	289,527	68,444	18,187	9,917	967,134
1951	400,279	143,292	296,434	64,085	18,223	11,658	933,971
1952	377,688	155,608	236,689	51,318	17,205	14,275	852,783
1953	406,988	178,182	307,445	54,649	20,675	17,988	985,927
1954	403,463	108,268	290,846	47,486	18,701	15,535	884,299
1955	451,141	146,243	430,807	51,589	22,433	17,599	1,119,812
1956	439,146	124,004	360,507	47,359	19,160	18,614	1,008,790
1957	367,757	112,390	376,039	41,269	20,428	17,737	935,620
1958	381,229	101,375	316,830	40,616	13,331	14,946	868,327
1959	361,027	129,278	389,331	42,949	18,248	15,364	956,197
1960	371,589	99,023	338,373	38,696	15,593	14,610	877,884
1961	382,077	128,523	341,766	41,204	18,137	19,506	931,213
1962	388,570	129,805	423,608	42,233	18,517	29,088	1,031,821
1963	420,287	128,237	468,619	42,166	16,037	29,767	1,105,113
1964	456,336	135,095	524,582	44,181	19,991	27,083	1,207,268
1965	482,421	126,848	637,970	45,882	25,781	35,190	1,354,092
1966	495,967	185,552	606,036	52,612	28,438	41,592	1,410,197
1967	458,605	131,537	535,118	45,443	29,774	36,331	1,236,808

Source: U. S. Bureau of Mines

TABLE VI

SALIENT ZINC STATISTICS OF THE UNITED STATES

Short Tons		
	1966	1967
Production:		
Mine, recoverable zinc	572,558	549,413
Smelter, slab zinc	1,108,329	1,012,335
Stocks of slab zinc, end of Period:		
Producer	64,798	81,916
Consumer	r 129,593	102,456
Total	r 194,391	184,372
Imports (general)		
Ores and concentrates (zinc content)	521,320	534,092
Slab zinc	278,175	222,112
Total	799,495	756,204
Exports:		
Slab zinc	1,406	16,809
Consumption:		
Slab zinc	1,410,197	1,236,808
Zinc in ores consumed directly (recoverable)	126,696	114,301
Zinc-base scrap (recov. zinc content)	94,580	91,675
Copper-base scrap " " "	167,615	142,779
Aluminum & magnesium base scrap (recov. zinc content)	7,455	6,434
Total	1,806,543	1,591,997

TABLE VII

ARIZONA AND WORLD MINE PRODUCTION OF RECOVERABLE ZINC

Short Tons		
Arizona Mine Production	15,985	14,330
U. S. Mine Production	572,558	549,413
World Mine Production	r 4,960,118	5,175,463
U. S. Mine Prod. as % of U.S. Reported Consumption	37.3%	40.7%
Avg. Price of Zinc, E. St. Louis (E&MJ)	r 14.5¢	13.9¢

r Revised.

TABLE VIII

U. S. CONSUMPTION OF SLAB ZINC

Short Tons			
	1965	1966	1967
Galvanizers	482,421	495,967	458,605
Die Casters	637,970	606,036	535,118
Brass Product	126,848	185,552	131,537
Rolled Zinc	45,882	52,612	45,443
Zinc Oxide & Other	60,971	70,030	66,105
TOTAL SLAB ZINC CONSUMPTION	1,354,092	1,410,197	1,236,808

Source: U. S. Bureau of Mines

TABLE IX

IMPORTS AND EXPORTS OF ZINC INTO AND FROM UNITED STATES

YEARS 1965, 1966 and 1967

Country of Origin	Short Tons		
	1965	1966	1967
Ores (Zinc Content)	428,040	521,320	534,092
Australia	2,667	4,334	4,836
Bolivia	4,093	5,788	9,576
Canada	201,353	272,950	289,387
Germany, West	1,341	9,685	6,248
Guatemala	4	318	- - -
Honduras	6,786	10,776	9,727
Mexico	117,354	114,677	119,135
Peru	73,721	78,254	69,357
Republic of South Africa	11,267	12,565	8,419
Other Countries	r 9,454	r 11,973	17,407
Blocks, Pigs or Slabs	152,990	278,175	222,112
Australia	1,120	27,007	7,187
Belgium-Luxembourg	8,889	27,469	16,100
Canada	88,554	116,778	80,487
Congo, Republic of the (Kinshasa)	12,614	12,814	2,921
Germany, West	230	6,062	939
Italy	2,129	- - -	- - -
Japan	12,995	19,805	41,621
Mexico	12,787	22,702	18,673
Peru	10,323	30,805	33,568
Yugoslavia	887	551	474
Other Countries	2,462	14,182	20,142
TOTAL IMPORTS	581,030	799,495	756,204
TOTAL EXPORTS (Slab Zinc)	5,939	1,406	16,809
EXCESS IMPORTS	575,091	798,089	739,395

Source: U. S. Bureau of Mines
U. S. Department of Commerce

L E A D - Z I N C

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TABLE I

U. S. AND ARIZONA MINE PRODUCTION OF RECOVERABLE LEAD

VALUE OF PRODUCTION BY YEARS FROM 1947 to 1967 INCLUSIVE

L E A D

Year	Avg. Price cts./lb	U.S. Mine Production		Arizona Mine Production	
		Tons	Value	Tons	Value
1947	14.673	384,221	\$112,750,000	28,566	\$ 8,383,000
1948	18.043	390,476	140,907,000	29,899	10,789,000
1949	15.364	409,908	125,957,000	33,568	10,315,000
1950	13.296	430,827	114,566,000	26,383	7,016,000
1951	17.500	388,164	135,857,000	17,394	6,088,000
1952	16.467	390,162	128,496,000	16,520	5,441,000
TOTAL		2,393,758	\$758,533,000	152,330	\$48,032,000
6 Yr. Avg.	15.844	398,960	\$126,422,000	25,388	\$ 8,005,000
1953	13.489	342,644	\$ 92,438,000	9,428	\$ 2,543,000
1954	14.054	325,419	91,470,000	8,385	2,357,000
1955	15.138	338,025	102,340,000	9,817	2,972,000
1956	16.013	352,826	112,996,000	11,999	3,843,000
1957	14.658	338,216	99,151,000	12,441	3,647,000
1958	12.109	267,377	64,753,000	11,890	2,880,000
1959	12.211	255,586	62,419,000	9,999	2,442,000
1960	11.948	246,669	58,944,000	8,495	2,030,000
1961	10.871	261,921	56,947,000	5,937	1,291,000
1962	9.631	236,956	45,642,000	6,966	1,342,000
1963	11.137	253,369	56,435,000	5,815	1,295,000
1964	13.596	286,010	77,772,000	6,147	1,611,000
1965	16.000	301,147	96,367,000	5,913	1,892,000
1966	15.115	327,368	98,963,000	5,211	1,575,000
1967	14.000	316,931	88,741,000	4,771	1,336,000
TOTAL 1953-1966		4,133,523	\$1,116,637,000	118,443	\$31,720,000
TOTAL 1953-1967		4,450,454	\$1,205,378,000	123,214	\$33,056,000
15 Yr. Avg.					
	U. S. 13.542	296,697	\$ 80,359,000		
	Ariz. 13.414			8,214	\$ 2,204,000
Annual Loss					
15 Yr. Period		102,263	\$ 46,063,000	17,174	\$ 5,801,000

TABLE II

U. S. AND ARIZONA MINE PRODUCTION OF RECOVERABLE ZINC

VALUE OF PRODUCTION BY YEARS FROM 1947 to 1967 INCLUSIVE

Z I N C

YEAR	Avg. Price cts./lb	U. S. Mine Production		Arizona Mine Production	
		Tons	Value	Tons	Value
1947	10.500	637,608	\$133,898,000	54,644	\$11,475,000
1948	13.589	629,977	171,215,000	54,478	14,806,000
1949	12.144	593,203	144,077,000	70,658	17,161,000
1950	13.866	623,375	172,874,000	60,480	16,772,000
1951	18.000	681,189	245,228,000	52,999	19,080,000
1952	16.215	666,001	215,984,000	47,143	15,288,000
TOTAL		3,831,353	\$1,083,276,000	340,402	\$94,582,000
6 Yr. Avg.	14.137	638,559	\$ 180,546,000	56,734	\$15,764,000
1953	10.855	547,430	\$ 118,847,000	27,530	\$ 5,977,000
1954	10.681	473,471	101,143,000	21,461	4,584,000
1955	12.299	514,671	126,599,000	22,684	5,580,000
1956	13.494	542,340	146,367,000	25,580	6,904,000
1957	11.399	531,735	121,225,000	33,905	7,730,000
1958	10.309	412,005	84,947,000	28,532	5,883,000
1959	11.448	425,303	97,377,000	37,325	8,546,000
1960	12.946	435,427	112,741,000	35,811	9,272,000
1961	11.542	464,390	107,200,000	29,585	6,829,000
1962	11.625	505,648	117,563,000	32,888	7,646,000
1963	11.997	529,254	126,989,000	25,419	6,099,000
1964	13.568	574,858	155,993,000	24,690	6,716,000
1965	14.500	611,153	177,234,000	21,757	6,310,000
1966	14.500	572,558	166,042,000	15,985	4,636,000
1967	13.850	549,413	152,187,000	14,330	3,969,000
TOTAL 1953-1966		7,140,243	\$ 1,760,267,000	383,152	\$92,712,000
TOTAL 1953-1967		7,689,656	\$ 1,912,454,000	397,482	\$96,681,000
15 Yr. Avg.					
U. S.	12.435	512,644	\$ 127,497,000		
Ariz.	12.162			26,499	\$ 6,445,000
Annual Loss					
15 Yr. Period		125,915	\$ 53,049,000	30,235	\$ 9,319,000

ARIZONA LEAD AND ZINC PRODUCTION IN 1967

Arizona produced 4,771 short tons of recoverable lead and 14,330 short tons of recoverable zinc in 1967. These tonnages represented 92 and 90 percent of the previous year's lead and zinc output respectively, and enabled the State to rank 5th in a national production comparison for lead but only 13th in a similar zinc tonnage comparison. These tonnages also represented 1.5 percent of the nations recoverable lead output and 2.6 percent of its recoverable zinc. The dollar value of the lead and zinc continued to move lower as the yearly average price of lead decreased from 15.115¢ in 1966 to 14.000¢ per pound, New York, in 1967, and zinc went from 14.500¢ to 13.850¢ per pound, St. Louis.

The Iron King mine, of the Shattuck Denn Mining Corporation, located at Humboldt east of Prescott, produced most of Arizona's lead and zinc during 1967. However; at the end of the year, the mine was forced to close as increasingly unfavorable economic conditions asserted themselves. These included; lower metal prices, decreased tonnage output and lower ore grade.

The CWT mine of the Continental Materials Corporation, the State's second largest producer and located in Pima County, produced zinc ore until it closed December 1st, 1967.

The Glove mine of the Arivaca Mining Corporation, located near Amado in Santa Cruz County closed in the Fall of 1967. Shipments of lead-silver concentrates by Lyman Wall from the New Chance and Linda mines in Yuma County were made intermittently during the year.

At the Old Dick mine (closed during 1966 when developed ore reserves were exhausted), the Cyprus Mines Corporation progressed with the deepening of the Bruce shaft. The shaft was planned to serve both the Old Dick and Copper Queen mines, after completion to a depth of 2200 feet.

Continued

Yavapai County produced over 90 percent of Arizona's lead and 70 percent of its zinc in 1967. Small amounts of lead were produced in Pima, Santa Cruz, and Yuma Counties. Nearly 1/4th of the zinc tonnage came from Pima County, mostly from the Mission and CWT copper and copper-zinc mines. Practically all the balance came from Mohave, Santa Cruz, and Cochise Counties.

Arizona produced 171 short tons of recoverable zinc in 1967. This compares with 177 short tons in 1966 and 171 short tons in 1965. The value of the lead and zinc continued to move lower as the yearly average price of lead decreased from 13.115¢ in 1966 to 14.000¢ per pound, New York, in 1967, and zinc went from 14.200¢ to 13.850¢ per pound, St. Louis.

The Iron King mine, of the Shattuck Denn Mining Corporation, located at Humboldt east of Prescott, produced most of Arizona's lead and zinc during 1967. However, at the end of the year, the mine was forced to close as increasingly unfavorable economic conditions asserted themselves. Prices included; lower metal prices, decreased tonnage output and lower ore grade.

The CWT mine of the Continental Materials Corporation, the State's second largest producer and located in Pima County, produced zinc ore until it closed December 1st, 1967.

The Grove mine of the Arizona Mining Corporation, located near Arado in Santa Cruz County closed in the Fall of 1967. Shipments of lead-zinc concentrates by Lyman Wall from the New Chance and Linda mines in Yuma County were made intermittently during the year.

At the Old Dick mine (closed during 1966 when developed ore reserves were exhausted), the Cyprus Mines Corporation progressed with the deepening of the Bruce shaft. The shaft was planned to serve the mine after completion.

Sources: Bureau of Mines Minerals Yearbook, The Mineral Industry of Arizona
28th Annual Report, Department of Mineral Resources,
State of Arizona, Phoenix.
29th Annual Report, Department of Mineral Resources,
State of Arizona, Phoenix.

MINE PRODUCTION OF GOLD, SILVER, COPPER, LEAD AND ZINC IN ARIZONA, 1967, BY CLASSES
OF ORE OR OTHER SOURCE MATERIALS, IN TERMS OF RECOVERABLE METALS

Source	Number of Mines ^{1/}	Material sold or treated (short tons)	Gold (troy Ounces)	Silver (troy Ounces)	Copper (pounds)	Lead (pounds)	Zinc (pounds)
Lode ore:							
Dry gold	5	474	29	105	14,300	- - -	- - -
Dry gold-silver	4	49,529	73	3,426	846,300	- - -	- - -
Dry silver	10	13,551	8	37,995	44,300	5,100	- - -
Total	19	63,554	110	41,526	904,900	5,100	- - -
Copper	35	74,289,203	66,933	3,996,587	901,853,500	300	672,400
Copper-zinc	2	17,306	10	6,937	585,600	2,900	1,363,800
Lead	3	1,163	4	2,122	3,300	116,500	7,200
Lead-zinc and zinc ^{2/}	^{3/} 7	344,307	12,997	526,233	1,014,700	9,350,400	26,616,600
Total	45	74,651,979	79,944	4,531,879	903,457,100	9,470,100	28,660,000
Other "lode" material:							
Gold-silver tailings	2	24,987	407	10,889	103,600	- - -	- - -
Copper cleanup	(^{4/})	1,309	31	868	296,500	- - -	- - -
Copper precipitates	21	66,892	- -	- - -	98,718,600	- - -	- - -
Lead cleanup	(^{4/})	288	350	2,919	1,300	66,800	- - -
Total	11	93,476	788	14,676	99,120,000	66,800	- - -
Total "lode" material	75	74,809,009	80,842	4,588,081	1,003,482,000	9,542,000	28,660,000
Placer	1	- - -	2	- - -	- - -	- - -	- - -
Total all sources	76	74,809,009	80,844	4,588,081	1,003,482,000	9,542,000	28,660,000

^{1/} Detail will not necessarily add to totals because some mines produce more than one class of material.

^{2/} Combined to avoid disclosing individual company confidential data.

^{3/} 6 lead-zinc mines and 1 zinc mine.

^{4/} From properties not classed as mines.

Source: U. S. Bureau of Mines.

PRODUCTION OF LEAD AND ZINC IN ARIZONA

Year	No. of Mines Est. By U.S.B.M.	Tons Material Treated	Tons Lead Produced	Tons Zinc Produced	Value of Lead Produced	Value of Zinc Produced	Average Price Lead	Average Price Zinc
1948	189	797,292	29,899	54,478	\$10,703,842	\$14,491,148	17.9¢	13.3¢
1949	174	968,301	33,568	70,658	\$10,607,488	\$17,523,184	15.8¢	12.4¢
1950	139	888,099	26,383	60,480	\$ 7,123,410	\$17,176,320	13.5¢	14.2¢
1951	136	954,985	17,394	52,999	\$ 6,018,324	\$19,291,636	17.3¢	18.2¢
1952	112	819,752	16,520	47,143	\$ 5,319,440	\$15,651,476	16.1¢	16.6¢
1953	68	452,660	9,428	27,530	\$ 2,470,136	\$ 6,331,900	13.1¢	11.5¢
1954	45	346,313	8,385	21,461	\$ 2,297,490	\$ 4,635,576	13.7¢	10.8¢
1955	46	408,486	9,817	22,684	2,925,466	\$ 5,580,264	14.9¢	12.3¢
1956	46	452,191	11,999	25,580	\$ 3,767,636	\$ 7,008,920	15.7¢	13.7¢
1957	45	431,327	12,441	33,905	\$ 3,558,126	\$ 7,865,960	14.3¢	11.6¢
1958	31	388,987	11,890	28,532	\$ 2,782,260	\$ 5,820,528	11.7¢	10.2¢
1959	22	449,166	9,999	37,325	\$ 2,299,770	\$ 8,534,750	11.5¢	11.5¢
1960	22	515,075	3,495	35,811	\$ 1,987,830	\$ 9,239,238	11.7¢	12.9¢
1961	22	433,680	5,937	29,585	\$ 1,291,000	\$ 6,804,550	10.9¢	11.5¢
1962	16	437,115	6,966	32,888	\$ 1,342,000	\$ 7,630,016	9.6¢	11.6¢
1963	17	419,853	5,815	25,419	\$ 1,256,000	\$ 5,846,000	11.1¢	12.0¢
1964	17	447,372	6,147	24,690	\$ 1,611,000	\$ 6,716,000	13.1¢	13.6¢
1965	16	425,895	5,913	21,757	\$ 1,892,000	\$ 6,310,000	16.0¢	14.5¢
1966	13	342,279	5,211	15,985	\$ 1,575,000	\$ 4,636,000	15.115¢	14.5¢
1967	10	345,470	4,771	14,330	\$ 1,336,000	\$ 3,969,000	14,000¢	13.9¢