

A State of the Iowa Concrete Industry Address



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Iowa Concrete Industry Address

- Sustainability
- Concrete
- Volume demand
- Supply Tightening
- Future of Concrete



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sustainability

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Roadmap to Carbon Neutrality



America's cement manufacturers have committed to the goal of reaching carbon neutrality throughout the cement-concrete-construction value chain by 2050.



https://www.cement.org/files/default-source/cement-concrete-association/2022/roadmap-to-carbon-neutrality_jan-2022.pdf
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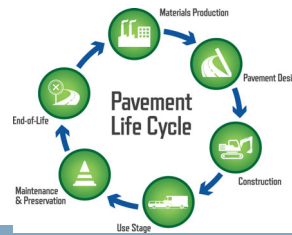
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What is Sustainability?



Example: Pavements, FHWA



Concrete

-There are nearly 3 tons (approx. 16-cubic yards) of concrete produced each year for every human on the planet, making it the most used man-made product in the world. Concrete production and concrete construction have an impact on almost every facet of human existence, particularly in developed nations.

-Concrete usage is two-times more than wood, steel, plastic, and aluminum combined. When you consider it, there are not many structures that don't include some type of cement-based building product.

Other than water, concrete is the most-used material on the planet, representing about 50% of all manmade materials by mass. Because society places so much concrete each year, even small changes to its formulation can have dramatic effects on the construction industry's annual carbon footprint—and benefits everyone on the planet.

U.S. Greenhouse Gas Emissions and Sinks (MMT CO₂ Equivalents)

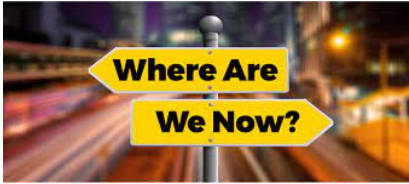
Gas/Source*	1990	2005	2016	2017	2018	2019	2020
CO₂	5,122.5	6,137.6	5,251.8	5,211.0	5,376.7	5,259.1	4,715.7
Fossil Fuel Combustion	4,731.2	5,752.0	4,909.6	4,853.3	4,989.3	4,852.3	4,342.7
Transportation	1,468.9	1,858.6	1,757.6	1,780.0	1,812.8	1,813.8	1,572.0
Electric Power Sector	1,820.0	2,400.1	1,808.9	1,732.0	1,752.9	1,606.1	1,439.0
Industrial	853.7	851.5	792.7	790.4	814.1	816.1	766.3
Residential	338.6	358.9	292.8	293.4	338.2	341.4	315.8
Commercial	228.3	227.1	231.5	232.0	245.8	250.7	226.8
U.S. Territories	21.7	55.9	26.0	25.5	25.5	24.3	22.7
Non-Energy Use of Fuels	112.2	128.9	99.5	112.6	128.9	126.8	121.0
Natural Gas Systems	31.9	24.9	29.8	31.1	32.4	38.7	35.4
Cement Production	33.5	46.2	39.4	40.3	39.0	40.9	40.7
Lime Production	11.7	14.6	12.6	12.9	13.1	12.1	11.3
Other Process Uses of Carbonates	6.2	7.5	10.8	9.9	7.4	9.8	9.8
Glass Production	2.3	2.4	2.1	2.0	2.0	1.9	1.9
Soda Ash Production	1.4	1.7	1.7	1.8	1.7	1.8	1.5
Carbon Dioxide Consumption	1.5	1.4	4.6	4.6	4.1	4.9	5.0
Incineration of Waste	12.9	13.3	14.4	13.2	13.3	12.9	13.1
Titanium Dioxide Production	1.2	1.8	1.7	1.7	1.5	1.5	1.3
Aluminum Production	6.8	4.1	1.3	1.2	1.5	1.9	1.7
Iron and Steel Production & Metallurgical Coke Production	104.7	70.1	43.6	40.6	42.6	43.1	37.7



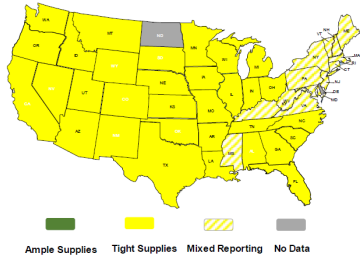
- Concrete is the 2nd Most Consumed Product on Earth
- Behind water

* Home/Business Opportunity, Contractor, International, Product Analysis & News/Concrete is the 2nd Most Consumed Product on Earth

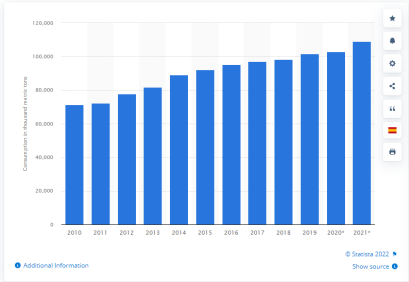
Concrete is the second most consumed product on earth, after water. Yet, by comparison, concrete construction represents millions of more jobs and a much greater economic return than water. In fact, sustainable water projects rely heavily on concrete for storage, distribution, and reclamation.



Cement Supply Survey
Existence of Supply Shortfall Based on Industry Survey



Construction
Apparent cement consumption in the U.S. from 2010 to 2021
(in 1,000 metric tons)



Winter?



Cement import affected



• <https://www.usgs.gov/centers/national-minerals-information-center/cement-statistics-and-information>

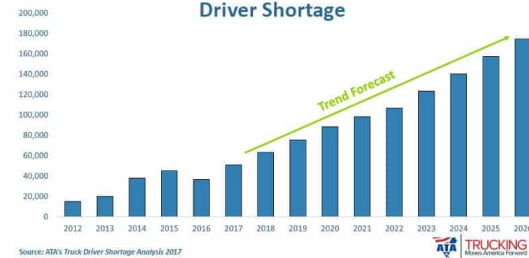
TABLE 10
SHIPMENTS OF PORTLAND CEMENT IN THE UNITED STATES, BY TYPE OF CARRIER^{1, 2}

(Thousand metric tons)

Type of carrier	Plant to terminal		Plant to customer		Terminal to customer		Total to customers ³
	In bulk	In bags ⁴	In bulk	In bags ⁴	In bulk	In bags ⁴	
2019:							
Railroad	13,300	13	951	--	631	1	1,580
Truck	7,980	661	48,000	977	47,600	266	96,800
Barge and boat	5,700	--	643	--	1,300	--	1,940
Total ⁵	27,000	674	49,600	977	49,500	267	100,000
2020:							
Railroad	14,800	--	1,090	752	649	1	2,490
Truck	10,300	42	47,600	2,830	47,100	257	97,800
Barge and boat	7,670	--	407	--	57	--	464
Total ⁵	32,770	42	49,100	3,580	47,800	258	101,000

Revised -- Zero
¹Table includes data available through May 12, 2022. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.
²Includes imported cement and cement made from imported clinker. Excludes Puerto Rico.
³Includes packages, bags, and superpacks.
⁴May not add to totals shown because of independent rounding.
⁵Shipments are based on an annual survey of plants and importers; may differ from totals in table 9, which are based on consolidated monthly data.

Driver Shortage

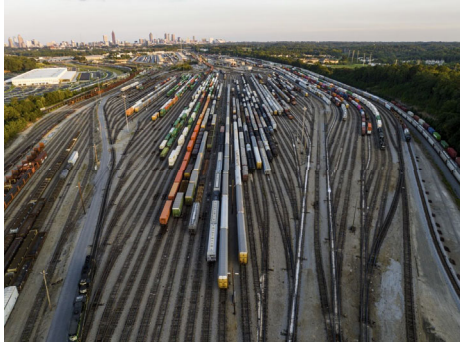


Source: ATA's Truck Driver Shortage Analysis 2017

Railroad

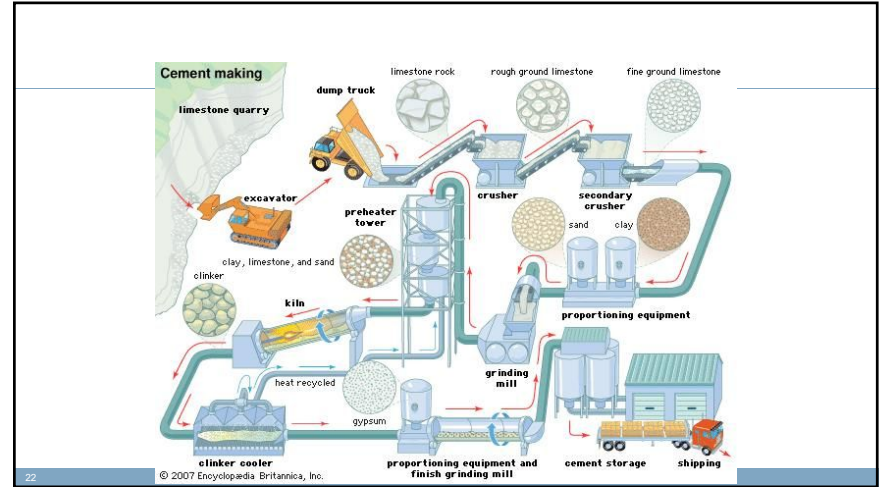


Railroad



Barges



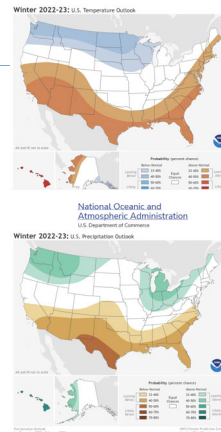


Add to the Logistics and supply

- 2022 saw random occasions of lower strength samples
- In depth review of what is important for your concrete design.
 - Is strength the most important characteristic?
 - Is 4,000PSI all you want in a mix?
- QC is very important.

Interesting times!

- Market demand
- Winter
- The war?
- Truck drivers are more available
- Fuel Prices? (hopefully peaked)
- Cement production adapting



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Concrete of today, concrete of the future



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What's next

EPD ENVIRONMENTAL PRODUCT DECLARATION

SUSTAINABLE CONCRETE PAVEMENTS: A Manual of Practice

KELLY TEST BOX TEST SUPER AIR METER RESISTIVITY

Advancements in Performance Engineered Mixtures (PEM)

IOWA STATE UNIVERSITY Institute for Transportation Peter Taylor, PhD, PE Mike Praul, PE

National Concrete Pavement Technology Center

CONCRETE TESTING ADHERENCE COLLABORATION. CTAC

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- Concrete is a needed commodity for advanced civilization.
- Concrete is important to local and global economies.
- Really smart people are working on concrete, concrete mixes, making it more resilient to the new environments and environmental conditions.
- Concrete will be here into the future.

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