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## Effects of Extreme Earthquakes in Central Turkey

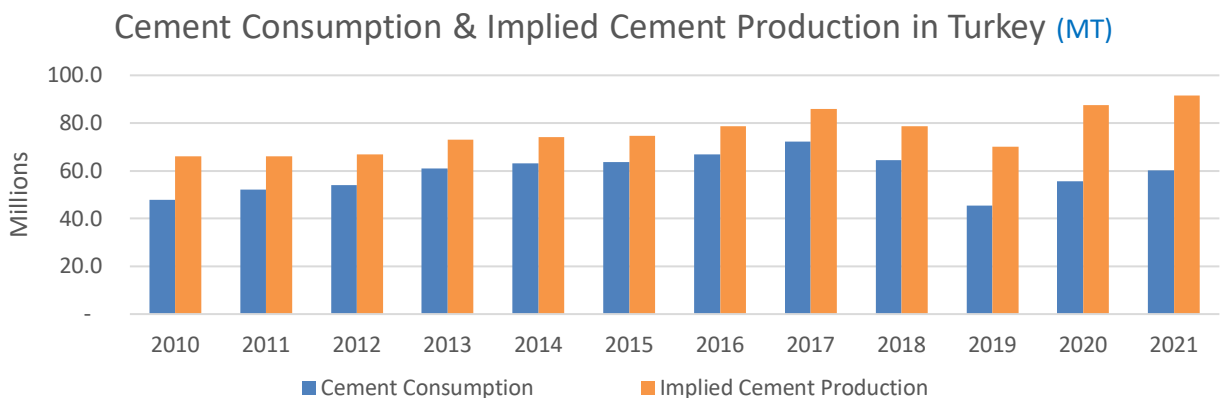
### Overview

On February 6, 2023, an extreme magnitude earthquake struck central Turkey as well as northern and western Syria. The initial earthquake was followed by equally devastating, strong aftershocks. Two additional milder earthquakes also occurred on February 20<sup>th</sup> and February 27<sup>th</sup>, contributing more deaths and damage to the already devastated region. As one of the strongest earthquakes on record for the region, the fatalities have reached more than 50,000 in Turkey and Syria as of February 27, 2023<sup>1</sup>. Millions of people have also been left homeless following the series of earthquakes that collapsed buildings, destroying an estimated 264,000 apartments<sup>2</sup>. The devastation in the region is estimated to reach \$84.1 billion USD according to the Turkish Enterprise and Business Confederation (TÜRKONFED)<sup>3</sup>. The damage seen throughout the region is likely to take considerable time, labor, and funding to begin to rebuild.

### Impact on Turkish Cement Exports

Turkey is one of the world's largest producers of cement. Turkey has a total of 58 cement plants with a clinker capacity of 97 mmt<sup>4</sup>. In 2021, the clinker capacity utilization rate for most Turkish cement plants was 88%. For the same year, PCA estimates implied cement production in Turkey was 92 mmt. This contrasts to 60 mmt of domestic cement consumption, according to data from the Turkish Cement Manufacturers' Association (TCMA).

Rebuilding after the earthquake will require more domestic cement. The Turkish government has said they are planning to rebuild 200,000 apartments and 70,000 village houses within 2023 at an estimated cost of \$15 billion USD<sup>5</sup>. JPMorgan has estimated the rebuilding efforts to cost \$25 billion USD for infrastructure and housing, which



Source: Turkish Cement Manufacturers' Association (TÜRKÇİMENTO)

<sup>1</sup> Azhari, T. (2023, February 27). "New Turkey quake kills one person, flattens more buildings". *Reuters*.

<sup>2</sup> Kilcoyne, C. and Kucukgocmen, A. (2023, February 17). "Three survivors pulled from rubble in Turkey 11 days after earthquake". *Reuters*.

<sup>3</sup> *Bloomberg HT* (2023, February 13). "TÜRKONFED report: The financial damage of earthquakes is expected to be 84.1 billion dollars".

<sup>4</sup> Turkish Cement Manufacturers' Association (Türk Çimento). (2021).

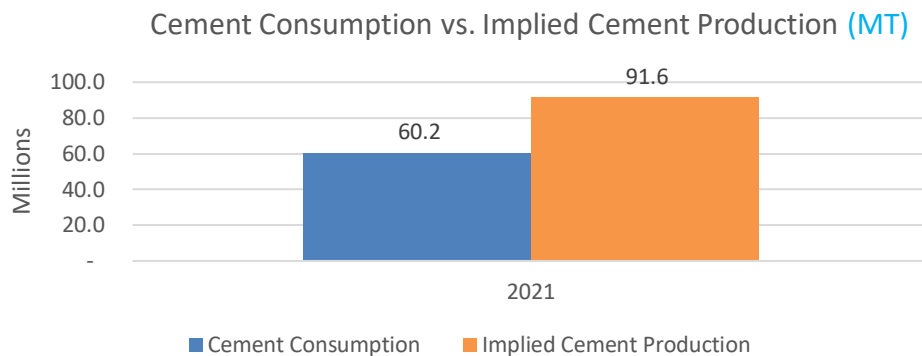
<sup>5</sup> Tokasbay, E. and O. Coskun. (2023, February 25). "Turkey begins to rebuild for 1.5 million left homeless by earthquakes". *Reuters*.

is nearly 2.5% of the country's GDP<sup>6</sup>. Estimates of cement demand have ranged from 10 to 13 mmt to meet the needs of the rebuilding efforts. For example, if Turkey requires an additional 12 mmt for rebuilding of what would otherwise be exported, this implies a reduction of roughly 40% from 2021 exported cement volumes. Regardless of the feasibility of the reconstruction timeline, the demand for cement within the country is likely to be affected. The efforts to rebuild the country's lost buildings and infrastructure will raise construction activity and, subsequently, demand for cement. This also comes at a time when demand for Turkish exports of cement may be higher in neighboring Syria and Ukraine.

Some of this increased demand for cement may be offset by weaker economic growth. According to a report released by the European Bank of Reconstruction and Development (EBRD), Turkey could face a loss of up to 1% of its GDP due to the earthquakes<sup>7</sup>. Slower GDP growth translates into slower construction activity in non-earthquake regions of the country. This could reduce some of the pressure placed on the cement industry to meet local demand without the need to sacrifice exports.

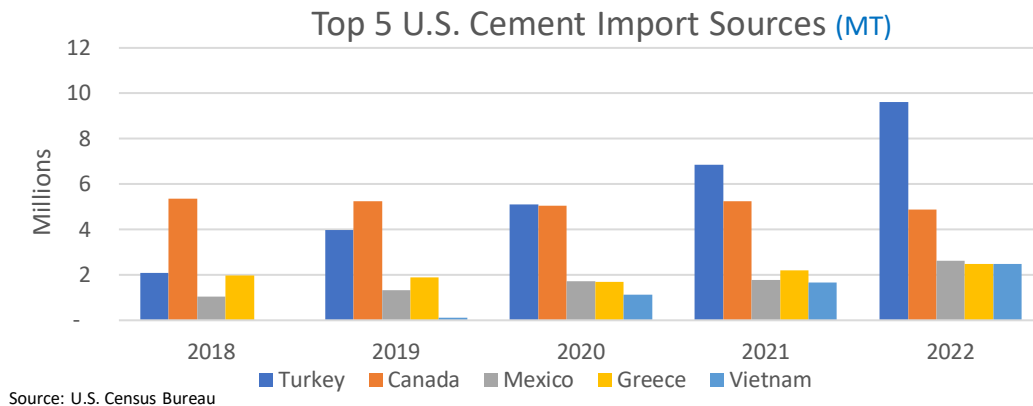
If no cement production facilities were impacted by the earthquake, an increase in clinker capacity utilization could theoretically allow the country to meet local demand without diminishing the volume of exports they have historically produced. Prior to the earthquake, however, the clinker capacity utilization rate was near its upper limit.

Based on the overlay of existing Turkish cement plants with a map of the earthquake-impacted region, 10 of the 58 cement plants may have been affected. Assuming the distribution of capacity is equal amongst the cement plants within the country, an estimated 17% of their clinker capacity may have been affected from the earthquakes. Any decrease in plant operating rates from the earthquake is likely to cause disruptions to the volume of exports available.



### Impact on U.S. Cement Consumption

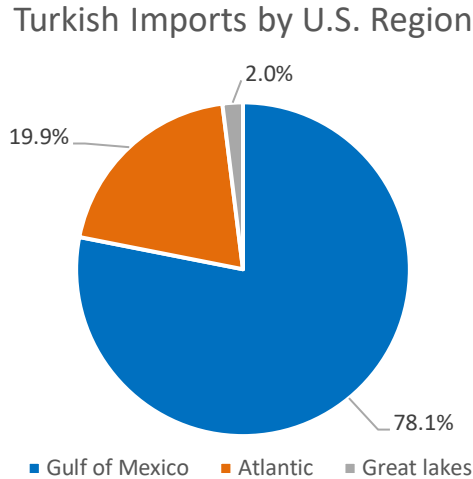
Since 2017, Turkey has steadily risen to become the largest exporter of cement into the United States. Turkey surpassed Canada as the largest cement exporter to the United States in 2020. From 2019 to 2021, Turkey has supplied an average of 5.2% of all cement consumed within the United States.



<sup>6</sup> Strohecker, K. (2023, February 16). "JPMorgan estimates Turkey direct quake damage at \$25 bln, expects rate cut". *Reuters*.

<sup>7</sup> *European Bank of Reconstruction and Development*. (2023, February 15). "Regional Economic Prospects".

In 2022, cement exports from Turkey supplied 10 mmt to the United States. This accounted for 31% of all Turkish finished cement exports. Ports within the Gulf of Mexico received the highest volume of exports from Turkey, followed by the Atlantic and Great Lakes regions. In 2022, the Pacific region did not import any cement from Turkey.



If imports from Turkey were diminished, the impacts for the U.S. cement market would primarily affect the Gulf of Mexico and Atlantic regions. In 2022, the Gulf of Mexico and Atlantic regions received 8 mmt and 2 mmt respectively from Turkey. In the event of a Turkish import disruption, these regions would likely source imports from other countries.

### Conclusion

Based on Turkey's most recent reported production capabilities coupled with heightened domestic demand, the earthquake's adverse impact on their ability to export could be substantial. Turkish Official's estimate rebuilding efforts may require as much as 13 mmt of cement which implies disruption up to 40% of cement that would otherwise be exported. However, PCA anticipates domestic demand for rebuilding efforts will be prolonged and will therefore diminish immediate impacts. Based on this, PCA estimates a reduction of as much as 22% of Turkish imports to the U.S., or 2 mmt of cement in 2023. Considering historical exposure, the Atlantic and Gulf of Mexico regions would see the largest impact in the event of a decline of imports from Turkey. To offset this deficiency, the U.S. is expected to source additional cement from other countries as need be in the event of a disruption.