

COVID-2019 IMPACT: MARCH 25TH UPDATE

March 25, 2020

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TEHCET's Supply-Chain Impact Summary (TSIS) provides an update on the coronavirus (COVID-19) situation. Information includes trends pertaining to the spread of the virus and the impact on economic activity with a focus on those regions of high importance to the semiconductor industry.

1. SUMMARY

The recent TECHCET COVID-19 survey confirmed logistic issues are emerging as a concern to CMC member companies and the semiconductor industry at large.

The global spread of the coronavirus outside of China continues to worsen as expanded availability to testing shows increasing cases in other countries and regions, especially in Europe and the U.S. As noted in last week's update, governments around the world have instituted border closures, travel restrictions, and community shutdowns. It is now recognized that the global economy experience a contraction in the first half of 2020 given the restricted economic activity caused by the response to address the COVID-19 virus pandemic.

Industry contacts in China reaffirm the improving work situation there as more employees are returning to the office to work though employees wear facemasks at work. The elderly and young are asked to stay indoors and away from crowds. No supply chain disruptions have been reported.

As noted in last week's update, the Malaysian government ordered a shutdown of businesses through to the end of March. TECHCET understands that package & assembly plants and fabs in Malaysia received special permission to continue to operate. GlobalWafers announced it was resuming production at its Malaysian plant following implementation of health & safety procedures for employees coming to the plant.

While no such shutdown is under place in Singapore, there are reports that some Malaysians who work in Singapore have been unable to return to work. Thus, some manufacturers in Singapore may not be at full staffing. As of March 23rd, Singapore announced restrictions on short-term visitors and passengers transiting through that country. Source: <https://chinapost.nownews.com/20200323-1095668>

Contacts in South Korea state the materials supply chain is stable and working.

The situation in the US is not consistent from state to state. Some have mandated shelter in place orders while others make this optional. The virus first appeared on the coastal areas including NY, Seattle, and San Francisco, but the number of cases has now grown to encompass every major city in the US. Reporting of cases is limited by low availability of test kits. The situation is changing day to day.

Information with regard to impact on the supply-chain from CMC Members is that there are no shut-downs of any material or chip fabricators, however all non-essential personnel are required to work from home. Industry

contacts indicate that materials ordering activity is also normal, and in some cases better than usual. Discussions lead us to believe that BCP protocols have been implemented by device makers (and OEMs), so these companies may be building up material supplier in anticipation of future, unknown disruptions because of the COVID-19 situation.

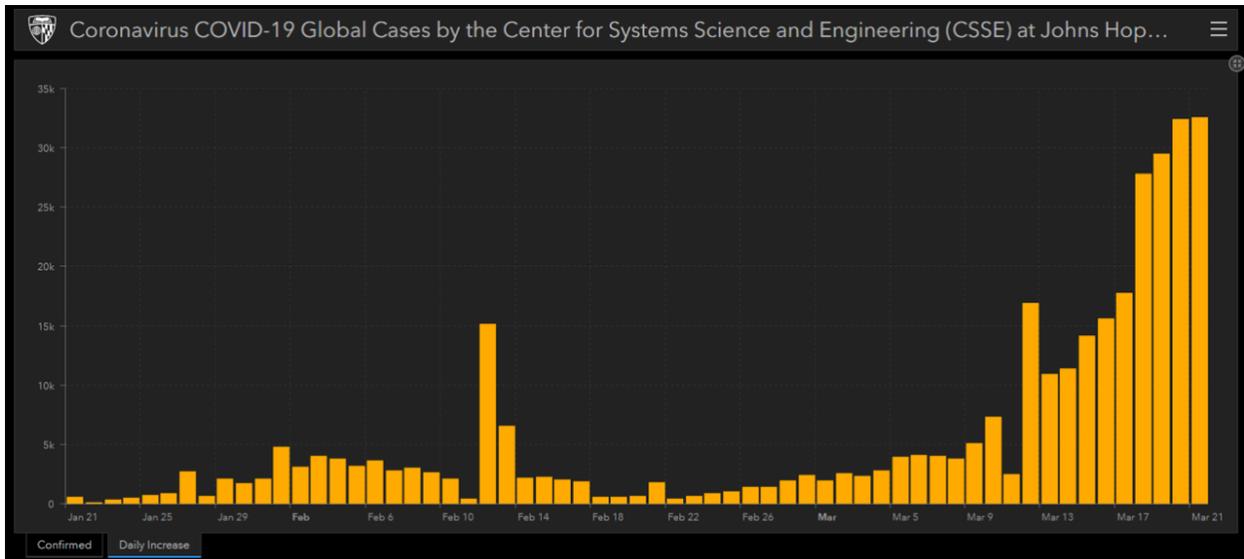
2. GLOBAL RATE OF INFECTION

Cumulative tracking of new cases (in and outside of China) and Total Recovered cases are now available on one. The rate of new cases within China has slowed, though the crisis is growing in Europe and the U.S. continues to grow. Source: Johns Hopkins University.

Figure 1 shows total new cases reported each day. The observed increase over the past week is a function of

1. the spread of the COVID-19 and
2. the increase availability of testing (As of March 23rd, 4PM ET U.S.)

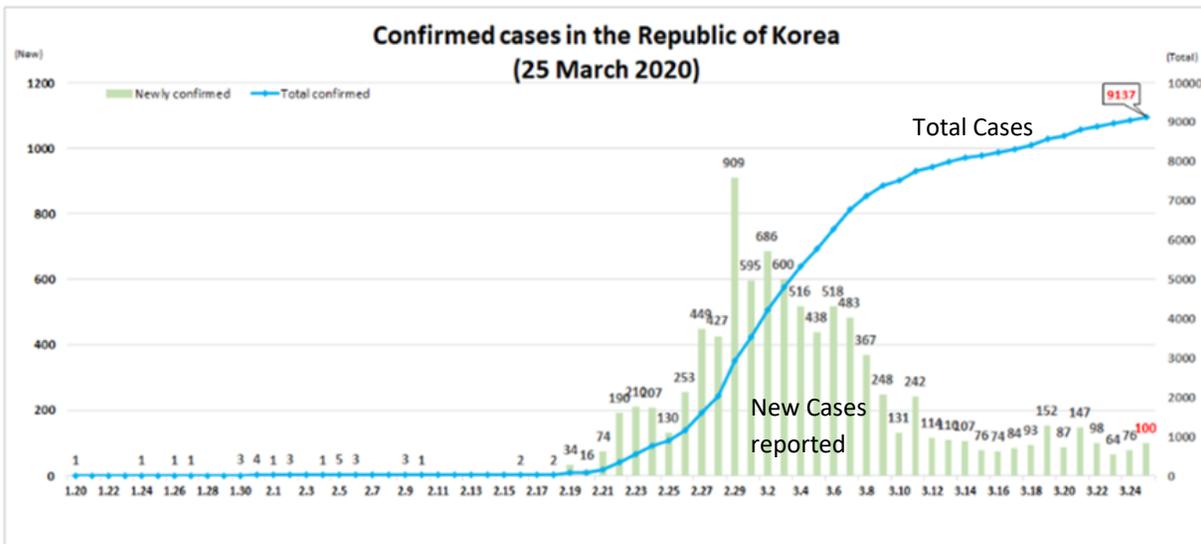
Figure 1: Coronavirus COVID-19 Global Cases Reported



Source: <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

Figure 2 highlights the reported new cases by the Korean CDC as of March 25th. New cases have trended below 200/day for the past two weeks., The Korean CDC officials have been acting upon an outbreak clusters over the past ten days, and on March 25th announced South Korea will impose a 14-day self-quarantine on citizens and foreigners with long-term stay visas arriving from the United States.

Figure 2: Coronavirus COVID-19 Daily New Cases and Daily Reported Recovery in South Korea



Source: <https://www.cdc.go.kr/board/board.es?mid=a30402000000&bid=0030>

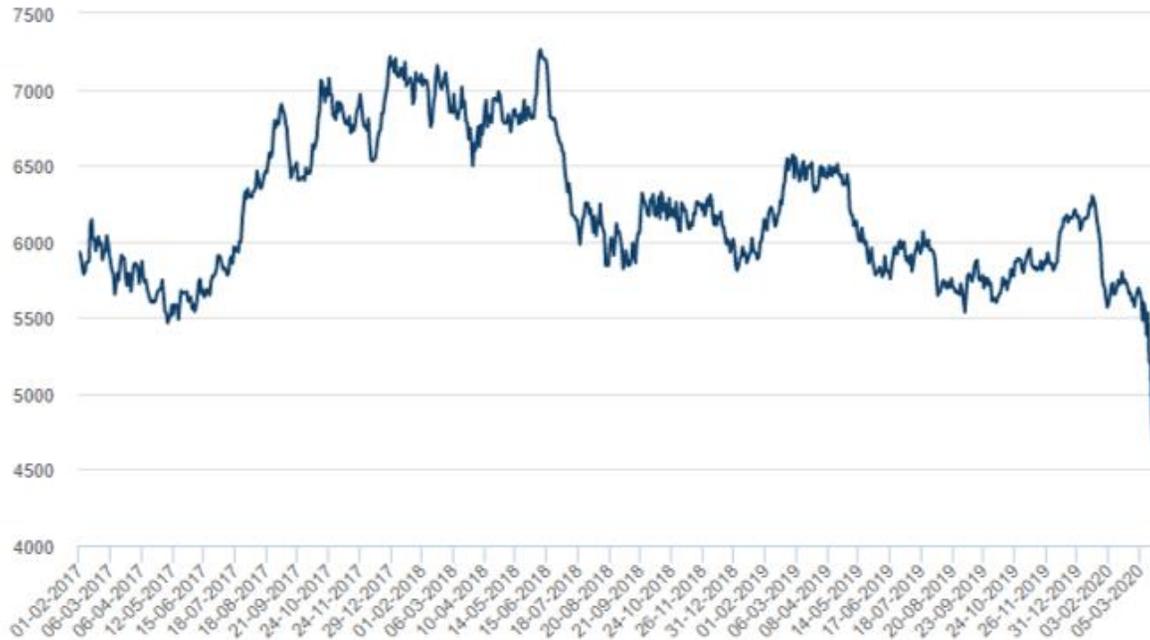
South Korea has implemented strict measures in screening and testing of visitors to that country. Although the cases per week are much lower than a month ago, industry sources indicate that new centers of infection have recently been identified (~3/20) which are now being addressed by healthcare workers and local government.

3. GLOBAL ECONOMIC INDICATORS

A typical indicator of economic trends, is the London Metals Exchange (LME) daily pricing for key metals used in manufacturing and construction. The LME is viewed as a measure of economic activity.. The LME has fallen off the US\$6300/tonne level of mid-January, following the signing of the China-U.S. Phase One Trade Agreement. The index appears to now be declining dramatically, below \$5000/tonne, reflecting the growing uncertainty because of the coronavirus and prospects for a deepening economic decline for 2020, as see in the following figure.

Figure 3: Daily LME Copper Metal Pricing Through March 23rd 2020

LME COPPER HISTORICAL PRICE GRAPH

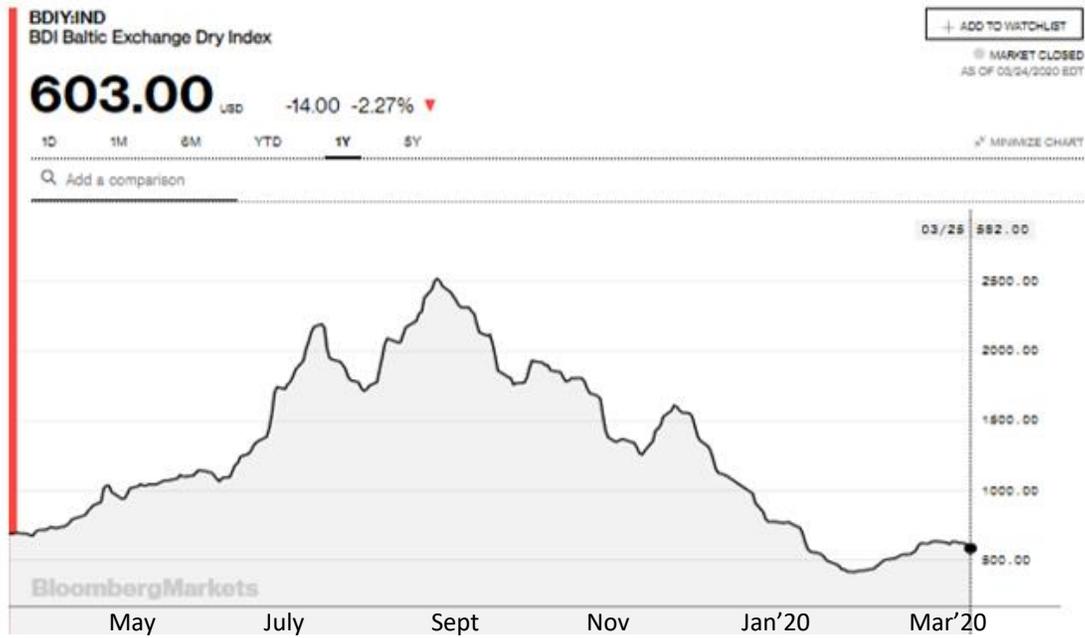


Source: <https://www.lme.com/Metals/Non-ferrous#tabIndex=0>

The Baltic Dry Index (BDI), generated by the London-based Baltic Exchange, is reported as a daily bellwether of trade and economic activity. The index measures the demand for shipping capacity. The demand for shipping will vary with the amount of cargo that is being traded (supply & demand) or moved in and out of various markets. In short, the BDI measures the daily demand for shipping capacity.

The Index shows a slow recovery from the low reported on February 10th, but as of March 23rd the index has been flat/slightly declining over the past 10 days. Thus, demand for shipping capacity has not yet recovered to pre-January levels, and appears to be trending down slightly as the COVID-19 situation spreads globally.

Figure 4: Daily Baltic Dry Index Through March 25th 2020



Source: <https://www.bloomberg.com/quote/BDIY:IND>

4. CHINA FREIGHT TRANSPORT TRENDS AND METRICS

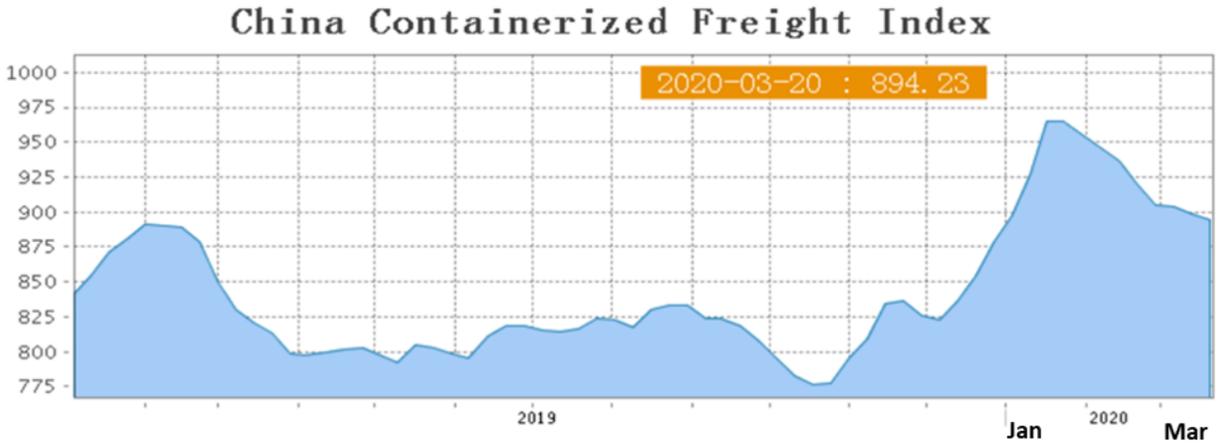
China's shipping metrics include various indexes tracked by the Ministry of Transport of the People's Republic of China and that are updated weekly. The rate of decline for indices is slowing.

CHINA (EXPORT) CONTAINERIZED FREIGHT INDEX (CCFI)

This index represents export containers for the ports in China. It is a metric which indicates the fluctuation in shipping price per container. (CCFI objectively shows the container transport market between the worldwide markets.) While declining with the March 20th data, the rate of decline was slightly improved from the previous week's index. This is not surprising as we have received reports indicating China businesses are starting to resume normal operations.

Figure 5 China Export Containerized Freight Index (CCFI) Trends Chart

Description	2020-02-28	2020-03-06	Previous Index 2020-03-13	Current Index 2020-03-20	Weekly Growth (%)
COMPOSITE INDEX	905.4	904.24	898.44	894.23	-0.5%



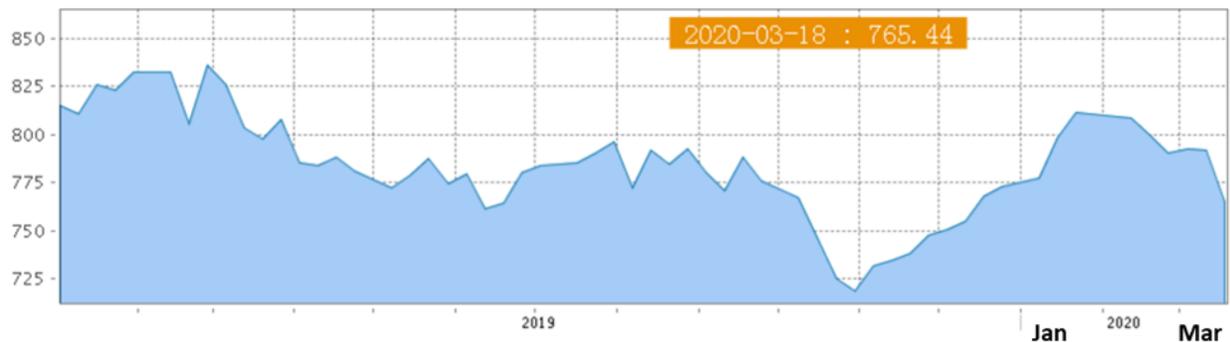
Source: Shanghai Shipping Exchange (updated on 03/13/2020), <https://en.sse.net.cn/indices/cbfinew.jsp>

CHINA (IMPORT) CONTAINERIZED FREIGHT INDEX (CCFI)

This CCFI index is for import containers for Chinese ports. Similar to the export CCFI, this index is a relative indicator of shipping prices of containers being imported to China. There was a sharp decline in the index reported on March 18th and looks to be represented of the impact of lower imports from China’s trading partners. This is consistent with reports we have received regarding shipping logistics challenges due to container availability.

Figure 6 China Import Containerized Freight Index (CCFI)

	2020-02-26	2020-03-04	Previous Index 2020-03-13	Current Index 2020-03-18	Weekly Growth (%)
Comprehensive Index	790.21	792.49	791.72	765.44	-3.3



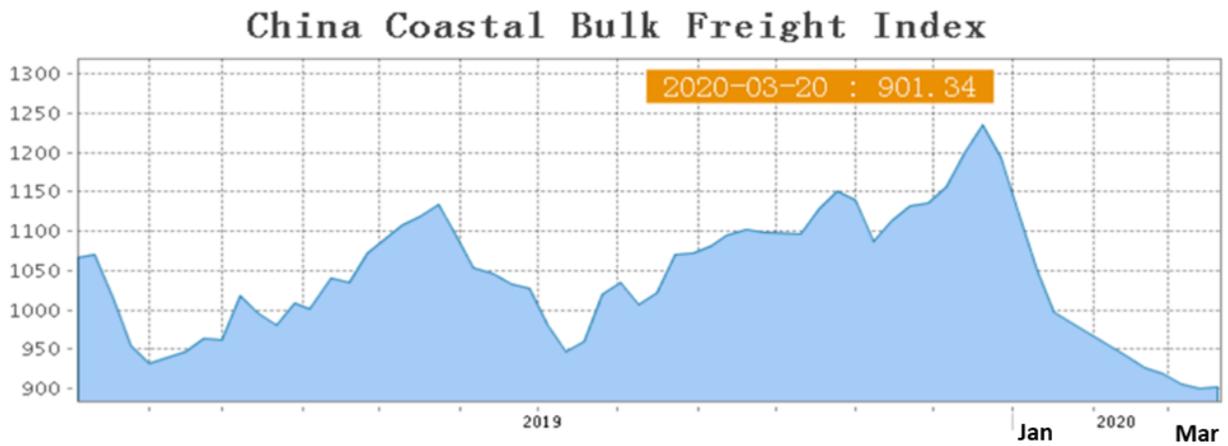
Source: Shanghai Shipping Exchange (updated on 03/11/2020): <https://www.sse.net.cn/index/singleIndex?indexType=cicfi>

CHINA COASTAL BULK FREIGHT INDEX (CBFI)

This index is a measure of the transportation of dry bulk goods between the different ports within China. In other words, this is an intra-China shipping index, and is based on the average revenue and average price of shipping. Activity remains low. This is likely a direct result of low import activity, previously stated.

Figure 2: China Coastal Bulk Freight Index (CBFI) Trends Chart

Description	2020-02-28	2020-03-06	Previous Index 2020-03-13	Current Index 2020-03-20	Weekly Growth (%)
COMPOSITE INDEX	918.56	905.09	901.18	901.34	0%
COASTAL DRY BULK INDEX	850.88	840.72	836.7	837.34	0.1%



Source: Shanghai Shipping Exchange (updated on 03/20/2020), <https://en.sse.net.cn/indices/cbfinew.jsp>