March 27, 2020

The Components of a Project Continuity Plan
The Components of a Project Continuity Plan

Construction Continues

- Diminished Labor Force
- Supply Chain Issues
- Availability of Non-Construction Personnel, Resources
- Planning Uncertainty

Construction Shutdown

- Safety, Security and Protective Measures
- Extended General Conditions and Overhead
- Stop Work Orders
- Longer Term Planning

Delay Damages and Consequential Impacts
Safety / Sanitation Protocols
Preparatory Measures - Administrative

The Components of a Project Continuity Plan
3. Have you experienced any project delays or disruptions due to the following? (Check all that apply)

- A shortage of materials, equipment or parts (please list specific items below, including any personal protective equipment, that have been in short supply) - 16%
- Any shortage of the craftworkers that either you or your subcontractors require (please list specific crafts below) - 11%
- Any shortage of government workers (whether to issue permits or certificates of occupancy, or to conduct inspections or lettings, or to make project awards) - 18%
- Any information to the effect that an infected individual has entered a jobsite and at least potentially infected it - 8%

1st Edition Survey (March 17 – 19)
Q4 Have you experienced any project delays or disruptions due to the following (check all that apply):

Answered: 1,317  Skipped: 199

- A shortage of materials...
- Any shortage of the...
- Any shortage of governmental...
- Any information ...
- None of above

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A shortage of materials, equipment or parts (please list specific items below, including any personal protective equipment, that have been in short supply)</td>
<td>22.70% 299</td>
</tr>
<tr>
<td>Any shortage of the craftworkers that either you or your subcontractors require (please list specific crafts below)</td>
<td>18.97% 238</td>
</tr>
<tr>
<td>Any shortage of government workers (whether to issue permits or certificates of occupancy, or to conduct inspections or lettings, or to make project awards)</td>
<td>16.17% 213</td>
</tr>
<tr>
<td>Any information to the effect that an infected individual has entered a job site and at least potentially infected it</td>
<td>12.98% 171</td>
</tr>
<tr>
<td>None of above</td>
<td>55.66% 712</td>
</tr>
</tbody>
</table>

2nd Edition Survey (as of 3/25/20, 9:00 am EDT)
Construction Continues

- Diminished Labor Force
- Supply Chain Issues
- Availability of Non-Construction Personnel, Resources
- Planning Uncertainty
- Delay Damages and Consequential Damages
- Safety / Sanitation Protocols

The Components of a Project Continuity Plan
<table>
<thead>
<tr>
<th>Location</th>
<th>Confirmed cases</th>
<th>Cases per 1M people</th>
<th>Recovered</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>549,474</td>
<td>77.98</td>
<td>128,701</td>
<td>24,883</td>
</tr>
<tr>
<td>United States</td>
<td>86,105</td>
<td>263.25</td>
<td>753</td>
<td>1,314</td>
</tr>
<tr>
<td>China</td>
<td>81,340</td>
<td>59.23</td>
<td>74,588</td>
<td>3,292</td>
</tr>
<tr>
<td>Italy</td>
<td>80,589</td>
<td>1275.84</td>
<td>10,361</td>
<td>8,215</td>
</tr>
</tbody>
</table>

As of March 27, 2020
Construction Workers

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total, 16 years and over</th>
<th>16 to 19 years</th>
<th>20 to 24 years</th>
<th>25 to 34 years</th>
<th>35 to 44 years</th>
<th>45 to 54 years</th>
<th>55 to 64 years</th>
<th>65 years and over</th>
<th>Median age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employed</td>
<td>157,538</td>
<td>5,150</td>
<td>14,172</td>
<td>35,807</td>
<td>33,127</td>
<td>32,042</td>
<td>26,893</td>
<td>10,347</td>
<td>42.3</td>
</tr>
<tr>
<td>Construction</td>
<td>11,373</td>
<td>193</td>
<td>875</td>
<td>2,502</td>
<td>2,831</td>
<td>2,454</td>
<td>1,909</td>
<td>609</td>
<td>42.6</td>
</tr>
</tbody>
</table>

Source: https://www.bls.gov/cps/cpsaat18b.htm
Project Supervision

- Separating project teams and limiting who is onsite
- Local resources
- Key personnel
  - Some sites require Licensed Superintendents and Safety Professionals – if these staff members are out sick, they must be replaced or permitted work cannot be performed.
- Security clearances
Subcontractors

• Subguard Insurance
• Performance Bonds
• Refusal to work
• Ability to supplement
**Cash buffer days** are the number of days of cash outflows a business could pay out of its cash balance were its inflows to stop. We estimate cash buffer days for a business by computing the ratio of its average daily cash balance to its average daily cash outflows.

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- Availability of Non-Construction Personnel, Resources
- Planning Uncertainty
- Delay Damages and Consequential Damages
- Safety / Sanitation Protocols
- Extended General Conditions and Overhead
- Planning Uncertainty
- Supply Chain Issues
- Diminished Labor Force
- Safety / Sanitation Protocols
- Delay Damages and Consequential Damages
U.S. manufacturing sector stalls as coronavirus hits supply chains

WASHINGTON (Reuters) - U.S. factory manufacturing activity slowed in February as new orders contracted, reflecting worries about supply chain disruptions related to the fast-spreading coronavirus outbreak, which has revived financial market fears of a recession.
4. Have any suppliers notified you or (to the best of your knowledge) your subcontractors that their deliveries will be late or cancelled? Responses: 901.

1st Edition Survey (March 17 – 19)
Q5 Have any suppliers notified you or (to the best of your knowledge) your subcontractors that their deliveries will be late or cancelled?

Answered: 1,315  Skipped: 191

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34.63%</td>
</tr>
<tr>
<td>No</td>
<td>65.17%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>

2nd Edition Survey (as of 3/25/20, 9:00 am EDT)
Supply Chain

- In the case of a subcontractor default, no excusable delay under FAR 52-249-8(d) if supplies or services “supplies or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery schedule”

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH5708</td>
<td>Fab and Deliver Structural Steel Framing - Bldg 254</td>
</tr>
<tr>
<td>NH5711</td>
<td>Fab and Deliver Steel Joist Framing - Bldg 254</td>
</tr>
<tr>
<td>NH5714</td>
<td>Fab and Deliver Steel Decking - Bldg 254</td>
</tr>
<tr>
<td>NH5750</td>
<td>Fab and Deliver Metal Wall Panels - Bldg 254</td>
</tr>
<tr>
<td>NH5753</td>
<td>Fab and Deliver Fab. Wall Panel Assem.-254</td>
</tr>
<tr>
<td>NH5765</td>
<td>Fab and Deliver Fabric Draft Curtain-254</td>
</tr>
<tr>
<td>NH5783</td>
<td>Fab and Deliver Vert. Lift Fabric Doors-254</td>
</tr>
<tr>
<td>NH5843</td>
<td>Fab and Deliver Trily Beam Rail Fall Prot.-254</td>
</tr>
<tr>
<td>NH5921</td>
<td>Fab and Deliver Condensing Boilers - Bldg 254</td>
</tr>
<tr>
<td>NH5924</td>
<td>Fab and Deliver Low-Intensity, Gas-Fired, Heater-254</td>
</tr>
</tbody>
</table>
Equipment and Facilities

- Owner FF&E
- Temporary hoist for elevator
- Cx, Startup, TAB
- Cranes and derricks
- Specialty equipment
- Concrete and asphalt plants
- Waste facilities
- Material supply companies, rental companies
Second-Degree Risks

- Substitution requests and assumption of liability
- Price differentials
- Escalation
- Out-of-sequence work
  - Project conditions
  - Productivity impacts
  - Constructability
Construction Continues

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- Planning Uncertainty
Disruption of Other Parties to the Construction Process

- Non-essential vs. essential
- Accounts payable
- Owner / Architect availability and responsiveness
- State and AHJ Inspections
- Manufacturer’s representatives
  - Certifications
  - Start-up
- Permit and permit renewals
  - DEP, DOT, DOB, etc.
- Road closures
- Project financing
  - Recorder’s Office closure
- Security clearances and badging
- Lodging, Food
- Notary for pay applications
The Components of a Project Continuity Plan

Construction Continues

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- Planning Uncertainty

Additional topics include:
- Downsizing / Rightsizing
- Safety and Security
- Extended General Conditions and Overhead
- Availability of Non-Construction Personnel, Resources
- Supply Chain Issues
- Diminished Labor Force
- Safety / Sanitation Protocols
- Delay Damages and Consequential Damages
- Planning Uncertainty
Project Planning Impacts

- Multi-day activity risks
  - Open excavations
  - Concrete curing
  - Steel erection
  - Mobilization of costly equipment
    - Pile Driving
    - Dewatering System
- Worker proximity
- Subcontractor mobilization risk
- Multi-prime construction
Project Pacing

• “A delay resulting from a conscious and contemporaneous decision to pace progress of an activity against another activity experiencing delay due to an independent cause.”

• Know your schedule, available float and float ownership

• Document your manpower management – justifying reductions is key
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<table>
<thead>
<tr>
<th>Critical</th>
<th>OR</th>
<th>Noncritical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excusable</td>
<td>OR</td>
<td>Inexcusable</td>
</tr>
<tr>
<td>Compensable</td>
<td>OR</td>
<td>Non-compensable</td>
</tr>
<tr>
<td>Concurrent</td>
<td>OR</td>
<td>Non-concurrent</td>
</tr>
</tbody>
</table>
Potential Delays

- Material delivery / supply chain delays
- Lost productivity
- Lack of timely inspections
- Owner responses / approvals
Contract Clauses

• FAR 52.243-1 through -4 Changes clause may be best avenue for cost and schedule relief if Government directs performance – typically requires direction from the Contracting Officer

• FAR 52.249-14 (Excusable Delays) excuses a contractor’s default “because of any failure to perform [the] contract under its terms if the failure arises from causes beyond the control and without the fault or negligence of the Contractor.”
  • Epidemics and quarantines
  • Need to prove actual delay – schedule relief, but no cost
  • Can provide relief from subcontractor defaults
**Business Policy Delays**

- Independent decision to protect personnel / company policy
  - May be no contractual relief
  - Review situation with Contracting Officer
  - “Commercial impracticability”
Best Practices

• **Bucketize**: Segregate and track costs

• **Document**: Include detail of impacts in project documentation (daily reports, meeting minutes); include comments in schedule updates with delay factors and efforts to overcome; increase frequency of schedule updates

• **Mitigate**: Ensure costs are reasonable; take proactive measures to avoid disruptions and delays

• **Owner acknowledgement**: Have tickets signed contemporaneously, seek change orders

• **Notify**: Comply with notice requirements of contract
Float Path Analysis

- Total Float is a measurement of “schedule flexibility” or slack of a particular activity sequence.
- Total Float values tell you the number of days a given activity can be delayed before it will delay the project.
- Identify the critical and near-critical work activities.
- Tracking manpower impacts to these paths is critical.

**Activity ID | Activity Name | Original Duration | Total Float**

| 0 | Phase 3 Start | 56 | 0 |
| 0 | Phase 3 Complete | 0 | 0 |
| 0 | Project Complete | 0 | 0 |

| 1 | Remove Kitchen Equipment | 2 | 1 |
| 3 | Rough in Power in Walls | 10 | 1 |
| 3 | Rough-in Telecom/DATA in Walls | 10 | 1 |
| 3 | Install Stage Lighting | 20 | 1 |
| 3 | Rough in Overhead Lighting controls | 10 | 1 |
| 3 | Rough in Overhead intercom/PA | 10 | 1 |
| 3 | Rough in Overhead Telecom/Data | 10 | 1 |
| 3 | Install Drops in Walls | 4 | 1 |
| 3 | EXT WINDOWS REVISIONS | 5 | 1 |
| 3 | Install Stage Sound | 10 | 1 |
| 3 | Pull Lighting Control Wiring | 10 | 1 |
Schedule Upkeep

- Completeness – deliverables and significant DFOW; material deliveries
- Sufficient detail
- Open-ended activities
  - Missing predecessors and/or successors
- Delineation of responsibilities
  - Separation of activities that require multiple parties’ input
  - Work performed by Owner and others that may affect performance
- Contract / Specification compliant
- Constraints and calendars
- Leads and lags
Other Considerations

- Storage fees
- Warranties
Productivity Impacts

The Components of a Project Continuity Plan
**Measured Mile**

- Establish baseline un-impacted period
- Needs to compare “identical” or very similar work
- Objective assessment of data
The Components of a Project Continuity Plan

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Controlling Infection Among Employees or Others Working on a Jobsite

- Examples of what Companies are currently doing.
  - Various levels of “Decontamination”
    - In-house laborers cleaning
    - Third party vendors
  - General Protocols (e.g. CDC) vs Site Specific Protocols.

Site Decontamination
Preventing Infection Among Employees or Others Working on a Jobsite

General Site Decontamination Protocols

- Criteria to Consider:
  - Traffic Patterns
  - Use of Approved Chemicals vs. “household” chemicals
- Use or aerosol. Fogging and airless spraying
  - HVAC configurations in enclosed spaces.
  - HASP amendment and proper PPE.
The Science of Infection Among Employees or Others Working on a Jobsite

Summary of the Science

- Virus vs. a microbiological contaminant like mold
- Conflicts and uncertainty of spreading mechanisms
  - Touch surfaces
  - Hand to mouth
  - Close contact
  - Airborne?
- Sanitization vs. Disinfection vs. Sterilization
Contracting for Prevention of Infection Among Employees or Others Working on a Jobsite

On-Call Contracts with Clean-Up Contractors

- Types and Examples of Companies that Can Disinfect Parts or All of A Project
- Qualifications to Consider
  - Approach
    - Written protocols
  - Biohazard experience
  - IICRC certification
- Contractual Issues to Consider
  - Project delivery
  - Guarantees
  - Insurance - Exclusions
The Components of a Project Continuity Plan

Construction Shutdown

- Preparatory Measures - Administrative
- Safety, Security and Protective Measures
- Extended General Conditions and Overhead
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Construction Continues

Stop Work Orders

Extended General Conditions and Overhead

Safety, Security and Protective Measures

Preparatory Measures - Administrative

Longer Term Planning
Pa. Contractors Rush To Respond to Construction Stop Order

Enforcement of state order to cease work begins March 21

Boston 1st major US city to order halt on all construction
Jobsite Documentation

• Photographs and videos
• Status construction schedule
• Payment application
Administrative Steps

- Ensure insurance coverages are current, including Owner’s policies and subcontractor policies
- Alert insurance and Builder’s Risk carriers if project is abruptly shut down
- Review business interruption and supply chain insurance policies
- Review contract and subcontract provisions for Force Majeure, work stoppages, notice requirements
- Provide notice to proper parties regarding jobsite closure and potential impacts
Technology Considerations

- Availability of documents onsite / remote access
- Cybercrime
  - Prepare staff for working remotely
- Online banking
- Payroll
- Accounts receivables
Evaluation of Standard Contract Clauses

- ConsensusDocs 200: §6.3.1
- AIA A201: §8.3.1
- FAR § 52.249-10
- FAR § 52.249-14

FAR: Provide written notice to the Contracting Officer within 10 days from the beginning of a delay

Subcontractor flow-down provisions
Key Considerations

(1) Provide timely notice of delays

(2) Document all evidence and attempts of efforts to meet construction schedule and overcome delays, and track resulting costs
   • Communications with suppliers
   • Communication with union hall
   • Efforts to mitigate damages
Construction Shutdown

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The Components of a Project Continuity Plan
Considerations

- Remove critical project documents and valuables to secure location
- Instruct delivery services for rerouting or holding deliveries
- Advise local authorities of site closure
- Prevent site access from authorized personnel
- Maintain construction fencing and postings
- Safely store and maintain equipment
- Site security services
- Security lighting and cameras
  - Web-enabled cameras
Material Storage

- Review contract and manufacturer recommendations for proper storage
- Temperature, humidity, moisture, UV-exposure, oxidation
- Flammable and hazardous materials
  - Remove any volatile gases and liquids
- Ballast light-weight materials
- Preventative maintenance
Temporary Protection
Exposed Elements of the Work

LIMITATIONS
Perm-A-Barrier Wall Membrane systems must not be applied in areas where they will be permanently exposed to UV light and must be covered within a reasonable amount of time, not to exceed 30 days.

PRECAUTIONS
AIR-SHIELD LSR is not designed to perform as a permanently exposed membrane. Maximum UV exposure period for membrane is four months. Keep containers tightly sealed. KEEP FROM FREEZING. Do not apply AIR-SHIELD LSR if rainfall or snow is forecast within 12 hours.
Tower Cranes

- Weathervaning
- Store in accordance with crane manufacturer recommendations and engineering drawings
Mothballing

• Check all guardrails, floor and shaft opening protection, hole covers, edge protection systems (netting, cocoon systems), temporary protective measures
• Maintain and secure all scaffolding, debris netting, sidewalk sheds and temporary walkways
• Maintain all adjoining property protection
• Eliminate tripping hazards, fall hazards
• Unplug and roll up electrical cords
• Secure all tools
• Provide subcontractors opportunity to remove personal tools
Mothballing

- Close and lock doors, windows, gates
- Check site fencing
- Lock all mechanical, electrical, telecom, elevator equipment rooms
- Lock out all electrical equipment
- Lock all storage containers and trailers
- Barrier or cover all excavations. Ensure proper shoring of excavated sites or backfill
- Secure all scaffolding and remove any materials stored on scaffold
- Block access to scaffolding, ladders, elevated floors
Mothballing

- Drain down all water systems if freeze / burst potential
- Rebar caps on exposed rebar
- Ensure roof and floor drains are clear. Prime drains as needed.
- Remove all trash and debris, eliminate any standing water
- Activate any available life safety systems
- Ensure positive drainage away from building
- Replace filters on HVAC system
- Ensure open ends of ductwork are sealed
- Ensure public walkways are clear and clean
Construction Shutdown

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The Components of a Project Continuity Plan
Limiting General Conditions and HOOH

- Demobilization of rental equipment
  - Will equipment be available upon re-start?
- Rental rate reduction
  - Equipment will likely be in standby
- Movement / storage / security of equipment
- Utility usage
- Office rent abatement
The Components of a Project Continuity Plan

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Construction Continues

Supply Chain Issues

Diminished Labor Force

Planning Uncertainty

Availability of Non-Construction Personnel, Resources

Extended General Conditions and Overhead
Work Stoppage

• For Federal projects, a suspension under FAR § 52.242-14 is more favorable for equitable adjustment – but will need to demonstrate delay is for “unreasonable period of time”

• Both ConsensusDocs 200 (§11.5.1) and AIA A201 (§14.1.3): upon seven days written notice to the Owner, can terminate the Contract and recover from the Owner payment for Work executed and costs incurred by reason of such termination.
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Construction Continues

Stop Work Orders

Extended General Conditions and Overhead

Safety, Security and Protective Measures

Preparatory Measures - Administrative

Longer Term Planning

Availability of Non-Construction Personnel, Resources

Diminished Labor Force

Supply Chain Issues

Planning Uncertainty

Longer Term Planning
As of 03/26/20:

Coronavirus Cases: 531,698

Active Cases: 383,700 (72%)
China

As of 03/26/20:

Coronavirus Cases: 81,340

Active Cases: 3,460 (4.2%)

Exponential Growth Date: Jan 22, 2020 (actual)

Curve Flattening Date: Feb 12, 2020 (actual)

New Recoveries > New Cases: Feb 18, 2020 (actual)

90+ Percent Recovered / Back to Work: Mar 22, 2020 (actual)
China

• ~81k total cases; ~5k remaining active cases
• On or about January 22nd, China's new case count started to spike exponentially. It took about 20 days from January 22nd before its overall case count started to level off and about 30 days before recoveries started to outpace new cases. After 60 days, or March 22nd, China is nearly fully recovered and has gone back to work.
• Trajectory: 20-day / 30-day / 60-day Cycle
S. Korea

As of 03/26/20:

Coronavirus Cases: 9,332

Active Cases: 4,665 (50%)

Exponential Growth Date: Feb 21, 2020 (actual)

Curve Flattening Date: Mar 10, 2020 (actual)

New Recoveries > New Cases: Mar 15, 2020 (actual)

90+ Percent Recovered / Back to Work: Apr 21, 2020 (prediction)
South Korea

- ~9k total cases; ~6k active cases
- On or about February 21st, South Korea's new case count started to spike exponentially. Similar to China, it took about 20 days before its overall new cases started to level off and about 30 days before recoveries started to outpace new cases (currently ~3k of ~9k cases are recovered). The 60-day mark for South Korea is April 21st, and South Korea is already starting to get back to work.
- Trajectory: 20-day / 30-day / 60-day Cycle
Iran

As of 03/26/20:

Coronavirus Cases:
32,332

Active Cases:
18,821 (58%)

Exponential Growth Date:
Mar 1, 2020

Curve Flattening Date:
Apr 1, 2020

New Recoveries > New Cases:
Apr 10, 2020

90+ Percent Recovered /
Back to Work:
May 10, 2020
• ~21k total cases; ~12k active cases

• On or about February 25th, Iran’s new case count started to spike exponentially. Unlike China and South Korea, Iran’s new case count has yet to level off in earnest. Over the past couple days, Iran’s new case count has declined, so it is likely that by a 30-day mark, Iran’s overall new case count will start to level off. Also, as you can see from the second graph listed below, the daily recovered cases in Iran is just about to eclipse the daily new case mark, so by day 40, this should happen. If you set Iran’s recovery mark at 70-days, this would mean that by May 5th Iran will be nearly at full recovery.

• Trajectory: 30-day / 40-day / 70-day Cycle
Italy

As of 03/26/20:

Coronavirus Cases: 80,589

Active Cases: 62,013 (77%)

Exponential Growth Date: Mar 1, 2020

Curve Flattening Date: Apr 1, 2020

New Recoveries > New Cases: Apr 10, 2020

90+ Percent Recovered / Back to Work: May 10, 2020
• ~59k total cases; ~46k remaining cases

• On or about March 1st, Italy’s new case count started to spike exponentially. Like Iran, Italy’s new case count continued to spike after its 20-day mark. If Italy’s case count starts to flatten at Day 30 that will be April 1<sup>st</sup>. On or about April 10<sup>th</sup>, Italy’s recoveries will likely start to outpace its new cases. The 70-day mark for Italy is on May 10<sup>th</sup>.

• Trajectory: 30-day / 40-day / 70-day Cycle
USA

As of 03/26/20:

Coronavirus Cases: 86,548

Active Cases: 83,338 (96%)

Exponential Growth Date: Mar 10, 2020

Curve Flattening Date: Apr 10 - 20, 2020

New Recoveries > New Cases: Apr 20 - 30, 2020

90+ Percent Recovered / Back to Work: May 10 - 20, 2020
Where coronavirus outbreak started in Washington state, officials see hope as cases appear to be leveling off

Robert Klemko 13 hrs ago
• On or about March 10th, the USA’s new case count started to spike exponentially. If USA follows the China/South Korea trend, USA’s overall case count should start to flatten on or about April 1st. In terms of when new recoveries will start to outpace new cases, that would likely occur on or about April 10th. The USA’s 60-day mark would be May 10th. If the USA follows an Iran/Italy-like trajectory, USA’s overall cast count will flatten out around April 10th, and daily recoveries would start to outpace daily new cases on Apr 20th, and the 70-day mark would be on May 20th, at which point the population can get back to work in earnest.

• Trajectory: 30-day / 40-day / 70-day Cycle
Questions?