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# Decoding the Mystery of Productivity Claims

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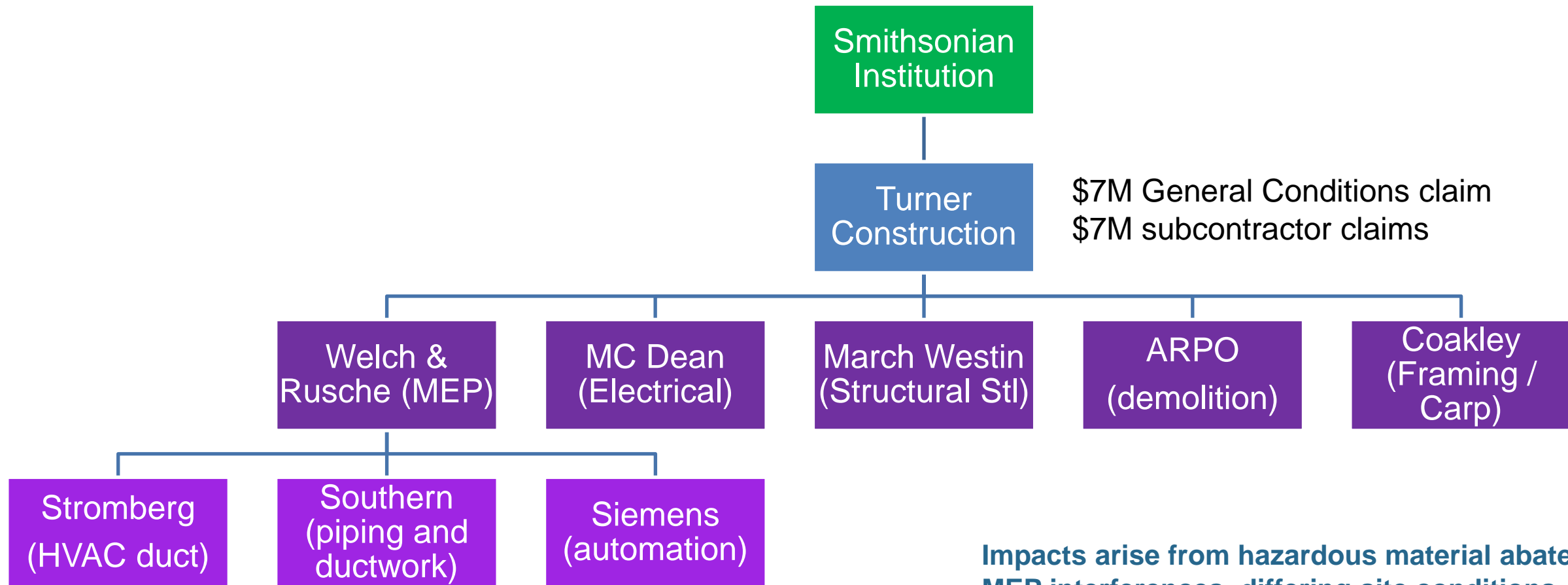
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# Turner v. Smithsonian



Impacts arise from hazardous material abatement, MEP interferences, differing site conditions, site access, unforeseen security requirements

# Productivity Claims

<p>Productivity = Output ÷ Input          = Units ÷ work-hours          = (Total output) ÷ (Total work-hours)</p> <p>“Quantities produced per employee hour of effort”          “Ratio of input to input”</p>	<p><i>Jelen's Cost and Optimization Engineering</i></p>
<p>“Output per hour of input”</p>	<p><i>Construction Management: A Professional Approach</i></p>
<p>“Relative measure of labor inefficiency, either good or bad, when compared to an establish base or norm as determined from an area of great experience.”</p>	<p><i>Project and Cost Engineers' Handbook</i></p>
<p>“Craft hours necessary to produce a unit of finished product”</p>	<p>Claims for Construction Productivity Losses</p>

AACE International Recommended Practice 25R-03

## Delay Claims

- Contract Time
- Field Office Overhead
- Home Office Overhead
- Equipment Costs
- Incentive bonuses
- Liquidated damages
- Lost revenue

## Productivity Claims

- Labor costs
- Certain non-critical delay costs, such as extended equipment

**“Claims of labor inefficiency are recognized to be both difficult to prove as to entitlement and even more difficult to quantify; the claims we confront here are no exception. The parties ably and efficiently presented their positions in both the hearing and the briefs; however, their presentation has not lessened the difficulty of our task.”**

*Clark Construction, 00-1 BCA ¶130,870; April 5, 2000*

# Legal Considerations

## Demonstrating Entitlement

- Liability: Owner contractually responsible for impact, i.e., proof that the Owner's actions or inactions changed the Contractor's costs for which the Owner is legally liable;
- Causation: Impact caused labor overruns;
- Injury/Resultant Cost Increase: Impact caused compensable loss.

## Common Defenses

- No damages for delay/disruption clause (rebuttal to this defense includes active interference; bad faith breach; owner delays that amount to abandonment of the contract; and owner delays not within the contemplation of the parties)
- Lack of notice
- Waiver/Release

# *Turner v Smithsonian*

## Procedural Defense

- Smithsonian argued that Turner subcontractors executed change orders and lien releases with Turner which released their claims
  - Some subs had attached pending change logs to releases
  - Some had reserved rights on executed change orders
  - Some provided contemporaneous notification of issues
- Smithsonian prevailed with respect to one subcontractor, who had executed a change order for overtime work

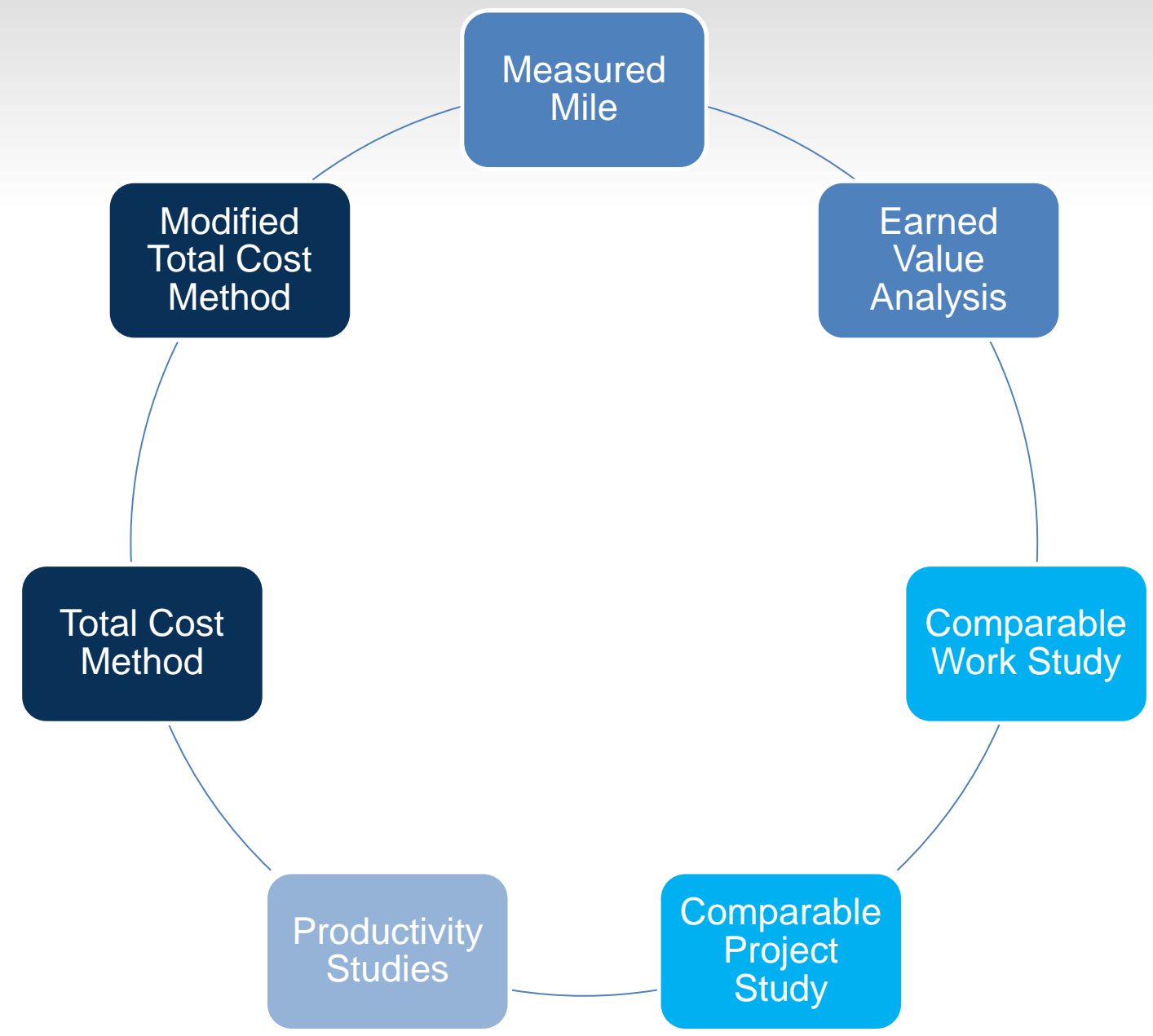
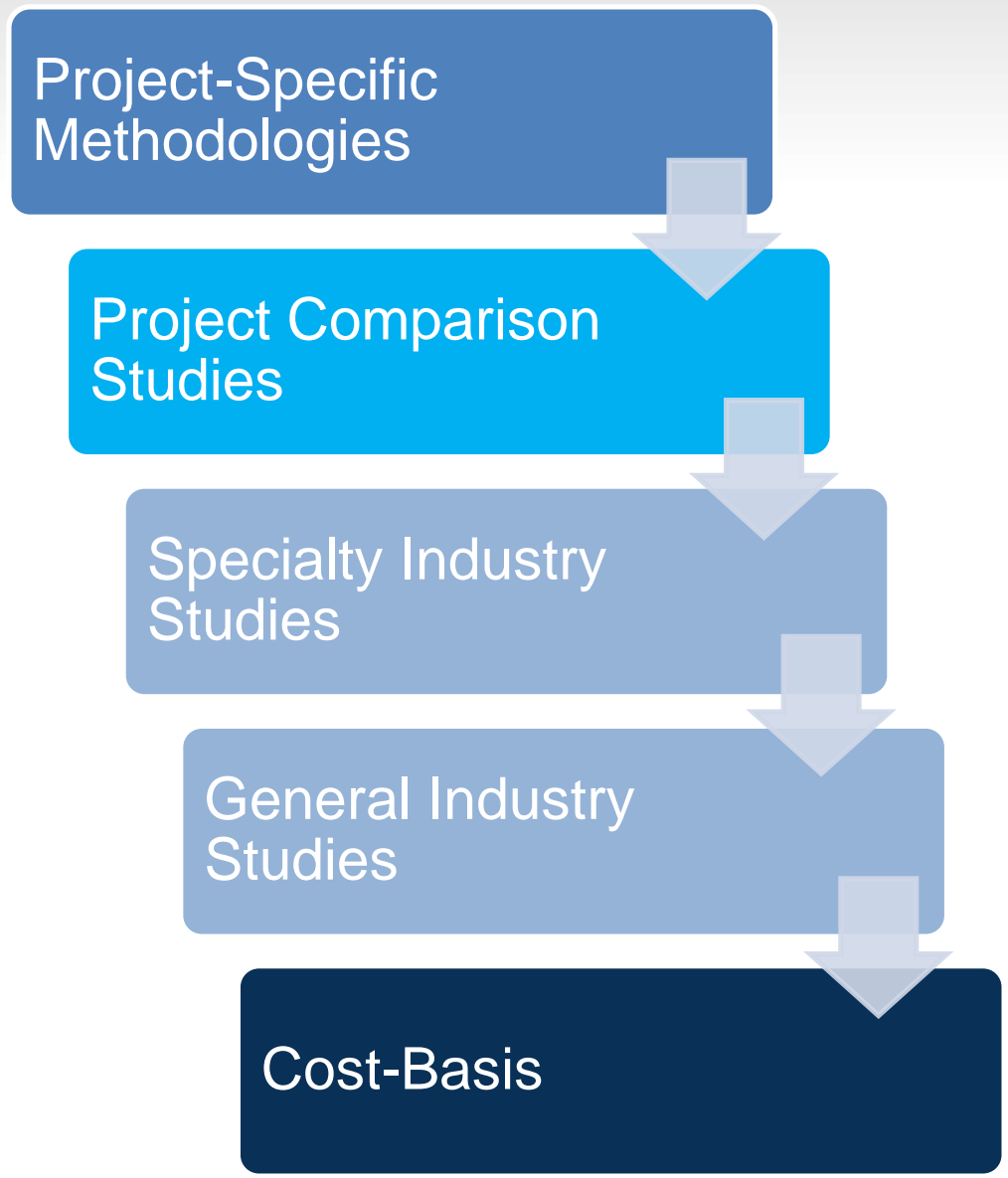
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Stromberg (HVAC ductwork)	• Measured Mile
Southern (Insulation)	• Modified total cost
Siemens (Automation)	• Total cost method
MC Dean (Electrical)	• “Industry studies”
March Westin (Structural Steel)	• Measured Mile
ARPO (Demolition)	• Measured Mile
Coakley (Carpentry / Drywall)	• Total cost method

- Three (3) Measured Miles
- Two (2) Industry Studies
- Three (3) Cost Methodologies

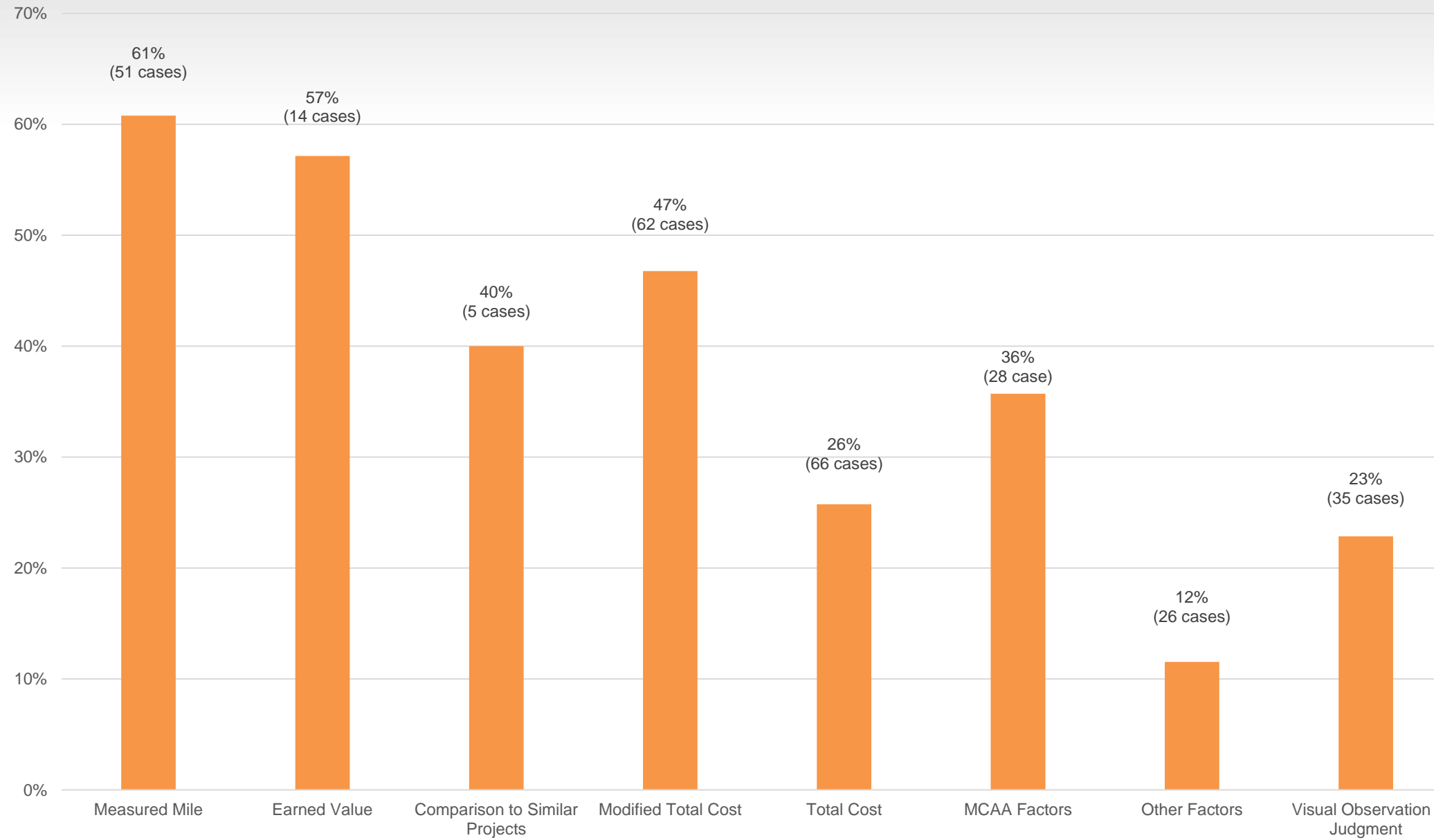
“To prove [lost productivity or labor inefficiency], the contractor must show the normal or expected level of performance and must also show the extent to which the Government’s action impacted that performance, reducing labor efficiency.”

*Stroh Corp.*, 96-1 BCA at 141,132.





## Acceptance Rates of LOP Quantification Methods



Data from W. Stephen Dale & Robert M. D'Onofrio,  
*Construction Schedule Delays* (2019).

# Factors Affecting Productivity

Absenteeism	Acceleration	Adverse / unusually severe weather	Availability of skilled labor	Changes / cumulative impact of changes / ripple	Competition for craft labor
Craft turnover	Crowding or stacking of trades	Defective design	Dilution of supervision	Excessive overtime	Failure to coordinate
Fatigue	Labor relations	Learning curve	Material / tool / equipment shortages	Overmanning	Poor morale
Out of sequence work	Rework and errors	Schedule compression	Site / work access restrictions	Site conditions	Untimely approvals / responses

AACE International Recommended Practice 25R-03

# Measured Mile

**Stromberg**  
(HVAC ductwork)

**March Westin**  
(Structural Steel)

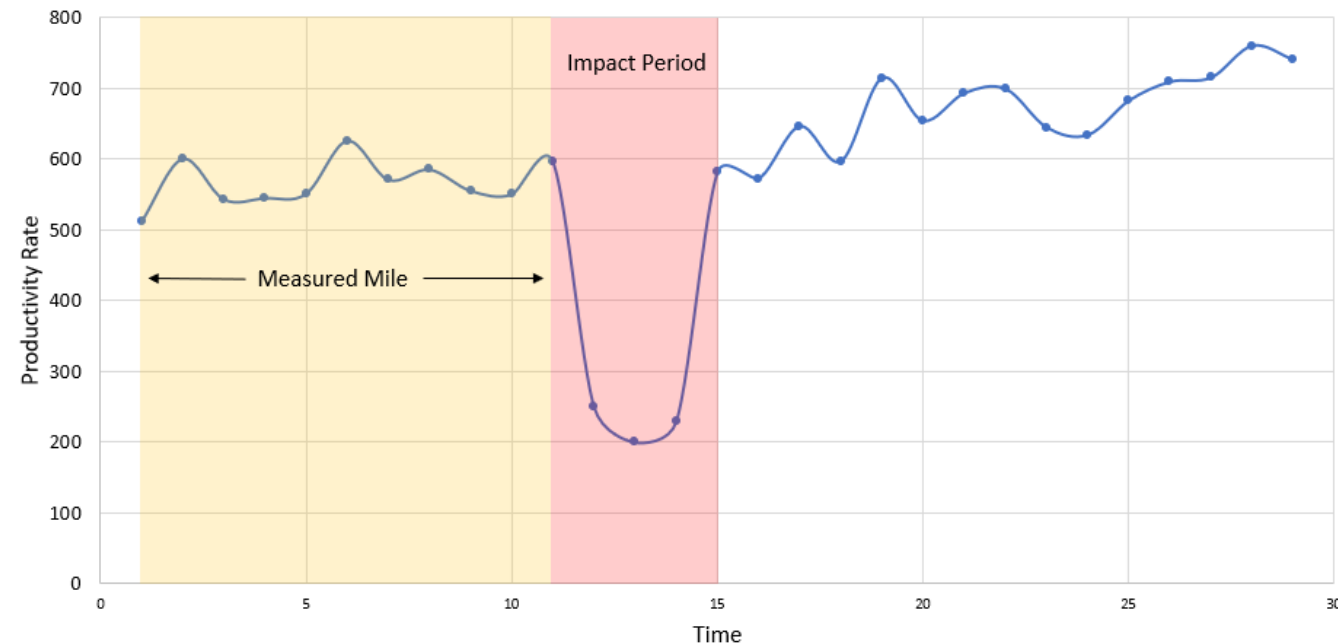
**ARPO**  
(Demolition)

“[P]ermit[s] a comparison of the labor costs of performing work during different periods of time, so as to show the extent to which costs increase from a standard during periods impacted by certain actions.”

*Clark Concrete Contractors, Inc. v. General Services Administration*, GSBCA 14340, 99-1 BCA ¶ 30,280, at 149,746.

# Measured Mile

- Compare impacted period to non-impacted period



Courts and boards have long recognized that “ascertainment of damages for labor inefficiency is not susceptible to absolute exactness.”

*Clark Concrete*, 99-1 BCA at 149,746; *Luria Brothers*, 369 F.2d at 712 (“[N]or does the impossibility of proving the amount with exactitude bar recovery for [loss of productivity].”).

The Board will “accept a comparison if it is between kinds of work which are reasonably alike, such that the approximations it involves will be meaningful.”

*Clark Concrete*, 99-1 BCA at 149,747.

# Measured Mile

**Stromberg**  
(HVAC ductwork)

- Unforeseeable O/H interferences not on drawings only identified after ceilings removed -> piecemeal installation
- Had an area (2<sup>nd</sup> floor - south) without MEP interferences to use as baseline: 807 labor hours to install 9500-lbs of HVAC trunk and branch lines: 11.77 lbs/hr – not an issue that only a section of Level 2 was used.
- Total weight of ductwork, less approved/unapproved changes and measured mile area – should have spent 16,380 hours, but spent 34,985
- Multiplied difference in hours by average burdened field labor rate
- Stromberg's measured mile is successful:
  - Performed same type of work throughout the Project
  - Identified non-impacted section and compared its progress here to remaining work on project
  - Used actual hours and costs to calculate its claim

# Measured Mile

**March Westin**  
(Structural Steel)

- Structural steel work at all 5 fives of museum – planned to work top-down.
- Hazardous material to be abated and MEP interferences to be relocated before work could proceed: out-of-sequence / hopscotch work
- Acceleration and trade stacking needed to complete project
- March Westin’s measured mile is successful:
  - Identified “less impacted” period early in project
  - Made sure to only consider field erection labor in its evaluation
  - Able to properly isolate additional inefficient hours spent by March Westin

# Measured Mile

APRO  
(Demolition)

- Hazardous material encountered: piecemeal / out-of-sequence work
- Could not use building electrical shafts as trash chutes as planned – had to use two elevators which were used by all contractor personnel
- October 2006: 856 labor hours to dispose 12 dumpster loads = 71 hrs/load, close to estimate of 69 hrs/load
- Project: 440 loads, adjusted to 375 to account for change and disputed work; therefore, “should have” spent 26,625 hours (375 x 71). Actual hours spent (without changes or disputed) was 50,318.
- To calculate loss, took adjusted hours spent, less anticipated hours, less its measured mile period (October), and removed 1,660 hours to account for its own inefficiency.
- ARPO’s measured mile was not successful:
  - Issue: demolition activities on each floor had different scopes and different manpower requirements – could not establish that work done in first month of demo was same as work done later.
  - October 2006 period was not a meaningful basis for comparison with the rest of the work



# Measured Mile – Practical Considerations

- Contemporaneous documentation and work logging
- Consider subdivision of cost codes by phase / area / location
- Actively segregate data during performance

# Industry Studies

Welch & Rushe  
(MEP)

MC Dean  
(Electrical)

Lost productivity can be shown through application of general industry factors when causation is established but the impact cannot be quantified by another method, such as a measured mile.

*Fire Security Systems, Inc.*, VABCA 5559, et al., 02-2 BCA ¶ 31,977, at 158,001-02.

Expert testimony on application of the factors must be supported by reliable empirical data.

See *Herman B. Taylor Construction Co. v. General Services Administration*, GSBCA 15421, 03-2 BCA ¶ 32,320, at 159,904.

# Industry Studies

Factor	Percent of Loss per Factor		
	Minor	Average	Severe
1. <b>STACKING OF TRADES:</b> Operations take place within physically limited space with other contractors. Results in congestion of personnel, inability to locate tools conveniently, increased loss of tools, additional safety hazards and increased visitors. Optimum crew size cannot be utilized.	10%	20%	30%
2. <b>MORALE AND ATTITUDE:</b> Excessive hazard, competition for overtime, over-inspection, multiple contract changes and rework, disruption of labor rhythm and scheduling, poor site conditions, etc.	5%	15%	30%
3. <b>REASSIGNMENT OF MANPOWER:</b> Loss occurs with move-on, move-off men because of unexpected changes, excessive changes, or demand made to expedite or reschedule completion of certain work phases. Preparation not possible for orderly change.	5%	10%	15%
4. <b>CREW SIZE INEFFICIENCY:</b> Additional workers to existing crews "breaks up" original team effort, affects labor rhythm. Applies to basic contract hours also.	10%	20%	30%
5. <b>CONCURRENT OPERATIONS:</b> Stacking of this contractor's own force. Effect of adding operation to already planned sequence of operations. Unless gradual and controlled implementation of additional operations made, factor will apply to all remaining and proposed contract hours.	5%	15%	25%
6. <b>DILUTION OF SUPERVISION:</b> Applies to both basic contract and proposed change. Supervision must be diverted to (a) analyze and plan change, (b) stop and replan affected work, (c) take-off, order and expedite material and equipment, (d) incorporate change into schedule, (e) instruct foreman and journeyman, (f) supervise work in progress, and (g) revise punch lists, testing and start-up requirements.	10%	15%	25%

“Quantification of loss of efficiency or impact claims is a particularly vexing and complex problem. We have recognized that maintaining cost records identifying and separating inefficiency costs to be both impractical and essentially impossible. Therefore, we have found percentage estimates of loss of efficiency to be an appropriate method to quantify such losses.”

*Clark Construction, 00-1 BCA ¶30,870; April 5, 2000*

*(Centex Bateson, 99-1 BCA ¶30,153;  
Fire Security Systems, Inc., VABCA No. 3086, 91-2  
BCA ¶23,743)*

# Industry Studies

Welch & Ruche  
(MEP)

- Access issues due to abatement and MEP interferences; investigation of unforeseen pipes and cables – disruption and delay in addressing these, with escorts; inoperable freight elevators; security requirements.
- Did not use measured mile because no good sample of an unimpacted time period, so identifying measured mile would be difficult
- Used MCAA labor factors: reassignment of manpower, concurrent operation, dilution of supervision, site access. Calculated 42% productivity loss.
- Welch's use of MCAA factors Issue was successful to an extent:
  - Nature of its work and nature of disruptions precluded a measured mile
  - Testimony supported selection of factors and severity of impact
  - Attempted to address its own labor inefficiency
  - However, failed to remove hours for approved or pending change work, but prevailed for adjusted amount



# Industry Studies

MC Dean  
(Electrical)

- Unforeseen hazardous materials, DSC, MEP interferences
- Out-of-sequence work: Needed to investigate and trace unexpected wiring, often through occupied areas requiring an escort. Needed to install temp wiring to allow continued operation while reconfiguring.
- “Looked at industry manuals” at calculated 34% productivity loss – multiplied its actual hours by the loss factor for lost hours, then multiplied by average rate
- Testified on crew inefficiency after working series of 60-hour weeks
- MC Dean’s use of efficiency factors was not successful:
  - Did not provide industry publication or expert testimony to support application of given factor. No evidentiary support.

“[T]he mere expression of an estimate as to the amount of productivity loss by an expert witness with nothing to support it will not establish the fundamental fact of resultant injury nor provide a sufficient basis for making a reasonably correct approximation of damages.”

*Luria Brothers*, 369 F.2d at 713

# Industry Studies – Practical Considerations

- Ensure that the model is being applied appropriately
- Establishing causation is paramount
- Link the LOP factors to project facts and documents
- Focus on main factors / use fewer factors

# Cost Methodologies

**Southern**  
(Insulation)

**Siemens**  
(Automation)

**Coakley**  
(Carpentry / Drywall)

“(1) the impracticability of proving its actual losses directly;  
(2) the reasonableness of its bid;  
(3) the reasonableness of its actual costs;  
and (4) lack of responsibility for the added costs.”

*Southern Comfort Builders, Inc. v. United States*, 67 Fed. Cl. 124, 146 (2005) (citing *Propellex Corp.*, 342 F.3d at 1339).

# Cost Methodologies

## Southern (Insulation)

- Out-of-sequence / piecemeal work
- Alleged no segment that afforded measured mile because of pervasive impacts – used modified-total cost
- Acknowledged underestimate in its bid for scissors lifts, and revised original bid accordingly
- Southern’s use of the modified-total cost was successful, *to an extent*.
  - Southern accounted for bid error and time for approved change orders
  - Established reasonableness of bid
  - Justified that another methodology for calculating inefficiency was not available
  - Southern failed to demonstrate that they was not responsible for any of its additional costs; and while Smithsonian could not point to specific Southern issues, they did point to numerous other performance difficulties of other subcontractors which Smithsonian was not responsible for.
  - The four-part test is stringent and when an element isn’t met, often resort to “jury verdict” approach: (1) clear proof of injury; (2) no more reliable method for calculating damages; (3) sufficient evidence to fairly and reasonably approximate damages. Board allowed for 10% of actual adjusted costs.



# Cost Methodologies

## Siemens (Automation)

- Come-back work / could not work in accordance with plan since needed to wait until other trades finished their work
- Used total cost most – actual vs. planned hours for each worker classification, and deducted settled changes (but not pending), multiplied by burdened labor rate
- Siemens's total cost methodology was not successful:
  - Relied on operations manager's testimony – could not testify to 2<sup>nd</sup> element of the 4-part test – the reasonableness of Siemens bid (had not prepared the bid, or even reviewed the bid in preparation for testimony)
  - Could also not comment on reasonableness of pass-through costs from its subcontractor, and could not be ascertained whether costs included costs of pending change orders – thus, failing 3<sup>rd</sup> element of 4-part test

2) Reasonableness of bid

3) Reasonableness of actual cost

# Cost Methodologies

**Coakley**  
(Carpentry / Drywall)

- Affected by all problems experienced by others – needed demo complete for layout and framing; rough-ins to hang drywall; overheads complete for ceiling. Resulted in acceleration – most impacted at 1<sup>st</sup> and 2<sup>nd</sup> floor
- Were paid direct cost of overtime in change orders - executed releases without any reservations

Through acceptance of this change order, the Subcontractor acknowledges that it has reviewed the progress of the Work related to this Project and the potential impact of the added work on the progress of the project in the future. As a result, this Change Order includes compensation to the Subcontractor for any and all effects, delays, inefficiencies or similar demands associated with this project and the Subcontractor recognizes that there is no basis for any such claim in the future.

- Testified hours were reasonable because 4<sup>th</sup> and 5<sup>th</sup> floor matched estimate
- Did not comment on what created the need to accelerate
- Testimony that they did not intend to release claim could not overcome clear release

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- \$3.15M to Turner (of \$7M) + interest
- \$2.8M to Turner subs (of \$7M) + interest

# LOP Practical Considerations

- Use the contract / subcontract to document assumptions, and incorporate proposal if applicable
- Maintain detailed records and cost control
- Provide notice and be aware of strict timing requirements for providing notice-written notice is key.
- Use caution executing releases, applying caveats where needed
- Plan to document productivity of representative work
- Each of the methodologies can prevail – need to make appropriate determination based on facts and documents at hand. Causation must always be established.
- Perform a project post-mortem and build productivity data

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