

**AACE International – North Florida Section  
Panel Discussion: Cost Escalation – What's  
Ahead and How to Handle It  
Orlando, Florida -- November 2008**

**Cost Escalation: Past, Present and Future**

**KSC Construction Cost Alert  
Labor and Materials Up 10% to 110%**

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Reference: JAB Cost Books Vol. 1, 6 & 15 & NASA Program Analysis Report, June 22, 2004, APB Vol. 16

**Cost Escalation and Labor Productivity Survey**

- What can we do about it?

| HISTORICAL SUMMARY OF VOTES                                                                                                        |                 |                        |                |                 |                 |                     |                    |       |  |  |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-----------------|-----------------|---------------------|--------------------|-------|--|--|
|                                                                                                                                    | Nov<br>01<br>FL | June<br>23<br>Montreal | Dec<br>3<br>FL | Jan<br>22<br>FL | Feb<br>19<br>FL | March<br>12<br>1997 | March<br>5<br>1998 | Total |  |  |
| 1. Education of the Consumers, Owners and Builders                                                                                 | 54              | 103                    | 61             | 48              | 87              | 11                  | 29                 | 319   |  |  |
| 2. More Efficient Management and Methods of Construction                                                                           | 49              | 93                     | 45             | 65              | 27              | 20                  | 19                 | 34    |  |  |
| 3. Political Activity for Legislative Action Right to Work, Regional Bargaining, Common Expiration of Labor Contracts, etc.        | 28              | 128                    | 41             | 27              | 27              | 7                   | 3                  | 9     |  |  |
| 4. Improved Engineering Design                                                                                                     | 18              | 46                     | 22             | 25              | 16              | 3                   | 23                 | 166   |  |  |
| 5. Owner Education as started by Anti-Inflation Roundtable                                                                         | 18              | 67                     | 11             | 20              | 3               | 0                   | 1                  | 66    |  |  |
| 6. Stopping Building Codes                                                                                                         | 4               | 31                     | 21             | 6               | 2               | 0                   | 1                  | 120   |  |  |
| 7. Mutual Consideration All Contracting Companies Joining to Make one Unified Body for Negotiation, etc. (Not AEC, ABC, NCA, etc.) | 0               | 78                     | 26             | 9               | 2               | 0                   | 0                  | 113   |  |  |
| Total                                                                                                                              | 171             | 551                    | 237            | 195             | 64              | 42                  | 102                | 1367  |  |  |

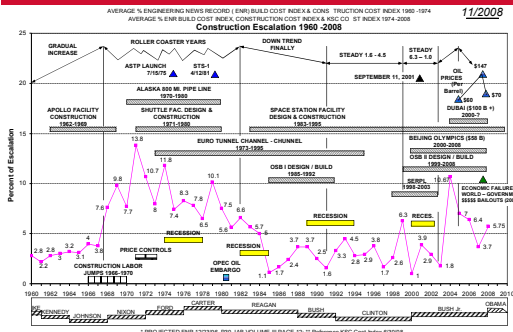
\* Added during discussion at Montreal presentation  
-- Highest total votes to date

Reference JAB Volume III – Page 21

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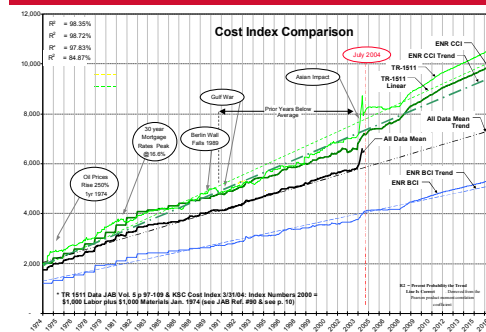
**Construction Cost Escalation Chart – 1960 thru 2008 (from JAB Vol III)**



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**Construction Economics (continued)**



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**Background – Time-line of Events (Labor and Material up 10 to 110%)**

- Dec. 15, 2003 Concrete going up for 2004 page 65
- Jan. 23, 2004 "Wow" 8 craft labor rates go up
- Feb. 2, 2004 USA Coff labor up 7% See J.A.B. for details\*
- March 31, 2004 KSC Cost Index Notes Big Jump in Material Prices and labor
- April 1, 2004 JAB Cost Alert Steel, Copper, Concrete, Aluminum, Lumber & Labor, etc., please consider 4-10% per year for escalation, and do a cost analysis on major multi-year projects.
- April 14, 2004 USA gets copy of March 25, 2004 letter\* to all distribution steel scrap up 60% in one year and 110% in 2 years – Pipe and fittings priced at delivery only. No more holding price 30 days to 6 months. Hard to bid projects. One comment some Government contracts may have to include Escalation clause.

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**Background – Time-line of Events (Labor and Material up 10 to 110%) (continued)**

- April 19, 2004 More trade labor increase electrical – 2<sup>nd</sup> time this year. Davis Bacon – April 2, 2004 new labor rates with PT&I from \$20.95/hr truck driver to \$47.97/hr for elevator construction. Ironworkers to \$44.52, electricians to \$41.18, sprinkler fitter to \$44.40, pipe fitter to \$41.91) (see APB Volume 16, page 39)
- April 2004 New Workman's Compensation Rates (WCR) go down but --- we should still use 53% for Budget PT&I due to new special 99% Premiums. (APB Volume page 37 – would raise WCR to 83% from 41.5% or PT&L of 94.73% for JUI rate with premium)
- May 6, 2004 Cost Engineering Comments – Some reasons for big cost increases – US Dollar down 30%, scrap prices up big, some commodities up big – copper, steel, aluminum, oil, gas, asphalt, and cement. China booming 9.7% growth, last quarter, causing big demand. US growth rate up – best in 3 years, Iraq Construction up, US housing market up big because of low interest rates, most types of insurance up – Medical, home, auto etc. also transportation up as oil prices rise. But some things down – computers, PC, blinds, access flooring, electronics, cell phones and long distance rates.

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## ENR July 2004 Construction Economics

### Cost Indexes

**Construction Cost Index**  
Despite intense materials price pressure, annual inflation measured by the CCI slipped from 6.4 to 6.2%.

| JUNE 2004                    | % CHG. MONTH | % CHG. YEAR |
|------------------------------|--------------|-------------|
| 20-CITY 1913=100 INDEX VALUE | 7196.80      | +0.6        |
| CONSTRUCTION COST            | 14893.50     | +0.3        |
| LABOR \$/HR.                 | 28.38        | +0.3        |

**Materials Cost Index**  
Lumber, steel and cement prices all increased this month, pushing the MCI 20% above a year ago.

| JUNE 2004                    | % CHG. MONTH | % CHG. YEAR |
|------------------------------|--------------|-------------|
| 20-CITY 1913=100 INDEX VALUE | 2948.00      | +2.7        |
| REINFORCING                  | 63.82        | +0.7        |
| CEMENT \$/TON                | 71.27        | +1.9        |
| STEEL \$/CWT                 | 302.90       | +2.7        |

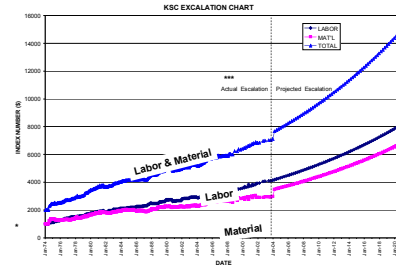
**Building Cost Index**  
Material price inflation has driven the BCI 8.7% above 2003's level. A year ago, annual escalation was just 1.5%.

| JUNE 2004                    | % CHG. MONTH | % CHG. YEAR |
|------------------------------|--------------|-------------|
| 20-CITY 1913=100 INDEX VALUE | 5906.76      | +1.0        |
| SKILLED LABOR                | 6998.41      | +0.4        |
| RAW \$/HR.                   | 37.18        | +0.4        |

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## KSC Annual Escalation 1974 – 2020\*\* (JAB Computerized Cost Escalation Program)



\*TR 1511 Data JAB Vol. 9 p. 91-109 & KSC Cost Index 331504; Index Numbers 2000 = \$1,000 Labor plus \$1,000 Materials Jan. 1974 (see JAB Ref. #99 & see p. 10)  
\*\*The JAB/SH Cost Escalation Program & Cost Data JAB Vol. V, p. 27-109; JAB Vol. IX & KSC Cost Index 331504

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- Oct. 2, 2006** - E mail alert update a recent REED (RS Means) report shows facility construction costs up an average of 10% and some materials cost up 12% to 24% (Remember our cost alert of 4/1/04 and update months before other report of pending cost escalation of 6/10% per year. This REED report confirms our early projection.
- Nov. 1, 2006** - Good News - Florida Today - State Approves Lower Workman's Compensation Rate (lower by nearly 16% (15.7%) to save employers 400 million)
- Nov. 11, 2006** - A mild hurricane season for 2006 should offer some relief to our current escalation problem.
- Dec. 1, 2006** - Christmas report, possible answers to cost escalation and U.S. economy problems. When high construction cost escalation should start stabilizing.
- Dec. 2, 2006** - How long will high construction cost escalation last?
  1. Until US dollar goes up 30% (to par)
  2. Until US recession/major depression in housing market (6/17/07 Housing)
  3. Until successful use of Helium 3 as a US electrical power source. This may take several years.
  4. Until Successful Solar Power Generation from Space, may take 2-10 years

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## KSC COST INDEX MARCH 30, 2007 NOW OUT

E-mail from JAB April 13, 2007: KSC INDEX SAYS "Use 8% per year to mid point of construction".  
JAB Comments "per index" "costs up 9.95% for 2006 --7.53% for 2005 & 24.36% for 2004" therefore confirming jab cost alert of 4/1/04"

### SUMMARY

What should be used for cost escalation for the NASA KSC Space Program for Space, Moon & Mars?

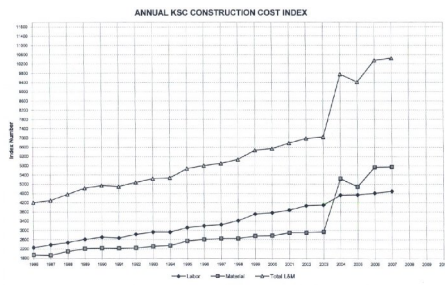
Consider using 5% to 10%\* per year, but on major multi-year that are heavy weighted in concrete, steel, rebar, copper, asphalt & aluminum do a cost analysis, get quotes on major cost items. Remember that impact, scheduling delays will cost extra for time extensions & change orders.

(\* wide variation for national and world economy, hurricanes, analysis, quotes, etc.)

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## Construction Cost Index



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September 2008 Change From Previous Quarter 4.22%  
See KSC Index for Changes Per Year

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## KSC Labor Cost Index

KSC Labor Cost Index  
September 2008

| SPONSOR/ACTIVITY | CREW                           | June 08 \$/hr. | July 08 \$/hr. | Aug 08 \$/hr. | Sept 08 \$/hr. | Change | Hour Rate | W/O P/F/E | W/O P/F/E \$/hr. | Hour Rate | W/O P/F/E \$/hr. | Hour Rate | W/O P/F/E \$/hr. |
|------------------|--------------------------------|----------------|----------------|---------------|----------------|--------|-----------|-----------|------------------|-----------|------------------|-----------|------------------|
| 1 GEN REG        | General Laborer & Truck Driver | 28.45          | 0.00           | 28.45         | 30.70          | 3      | 30.70     | 3         | 63.37            |           |                  |           |                  |
| 2 GEN REG        | EQUIP OPERATOR (CRANE)         | 29.81          | 0.10           | 29.91         | 33.93          | 3      | 33.93     | 3         | 71.42            |           |                  |           |                  |
| 3 STEWWORK       | PLUMBING MECHANIC              | 27.87          | 0.00           | 27.87         | 33.85          | 3      | 33.85     | 3         | 70.65            |           |                  |           |                  |
| 4 CONCRETE       | CONCRETE FORMWORK              | 33.94          | 0.15           | 34.09         | 34.66          | 10     | 34.66     | 10        | 248.07           |           |                  |           |                  |
| 5 MASONRY        | BLACK BRICKLAYER               | 40.76          | 0.14           | 40.90         | 38.60          | 10     | 38.60     | 10        | 298.03           |           |                  |           |                  |
| 6 METAL          | STRUCTURAL STEELER             | 49.87          | 1.00           | 48.87         | 51.60          | 14     | 51.60     | 14        | 442.70           |           |                  |           |                  |
| 8 CARPENTRY      | COMPUTER CRAWLER               | 37.03          | 0.02           | 37.05         | 38.42          | 3      | 38.42     | 3         | 79.23            |           |                  |           |                  |
| 9 MOUNT POINT    | ROOFER                         | 36.69          | 0.06           | 36.75         | 39.01          | 3      | 39.01     | 3         | 86.00            |           |                  |           |                  |
| 7 DODGE &        | COMPUTER CRAWLER               | 36.71          | 0.13           | 36.84         | 38.27          | 3      | 38.27     | 3         | 79.81            |           |                  |           |                  |
| 11 FURNISHING    | PAINTER                        | 37.87          | 1.48           | 39.35         | 37.88          | 3      | 39.35     | 3         | 96.88            |           |                  |           |                  |
| 10 SPECIALTIES   | COMPUTER CRAWLER               | 36.71          | 0.13           | 36.84         | 38.27          | 3      | 38.27     | 3         | 79.81            |           |                  |           |                  |
| 11 EQUIPMENT     | STRUCTURAL MECHANIC            | 55.40          | 1.86           | 57.26         | 40.28          | 6      | 40.28     | 6         | 341.98           |           |                  |           |                  |
| 12 FURNISHING    | COMPUTER CRAWLER               | 36.71          | 0.13           | 36.84         | 38.27          | 3      | 38.27     | 3         | 79.81            |           |                  |           |                  |
| 13 SING CONCRETE | COMPUTER CRAWLER               | 36.71          | 0.13           | 36.84         | 38.27          | 3      | 38.27     | 3         | 79.81            |           |                  |           |                  |
| 14 CONWAY SYS    | ELEVATOR MECHANIC              | 61.12          | 0.10           | 61.22         | 62.01          | 3      | 62.01     | 3         | 129.73           |           |                  |           |                  |
| 15 MECHANICAL    | PLUMBING CREW                  | 54.95          | 0.16           | 55.11         | 43.12          | 5      | 43.12     | 5         | 215.75           |           |                  |           |                  |
| 16 SHEET METAL   | SHEET METAL WORKER             | 48.01          | 0.18           | 48.19         | 47.15          | 6      | 47.15     | 6         | 283.73           |           |                  |           |                  |
| 17 PIPE          | PIPE FITTER CREW               | 54.00          | 0.19           | 54.19         | 43.12          | 5      | 43.12     | 5         | 215.75           |           |                  |           |                  |
| 18 ELECTRICAL    | ELECTRICAL CREW                | 43.07          | 0.16           | 43.23         | 38.60          | 10     | 38.60     | 10        | 388.00           |           |                  |           |                  |
| 19               | 3 Month 1 Lab./200 Women       | 37.32          | 0.13           | 37.45         | 39.05          |        |           |           |                  |           |                  |           |                  |

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## Costs

- Material Cost** – Material prices for the third quarter of 2008 increased for diesel fuel, asphalt paving, concrete, concrete block, structural steel, steel stud, built-up roofing, fiberglass insulation, gypsum board, black iron pipe, and electrical metallic tubing. There were no decreases in material costs.
- Labor Cost** – The latest Davis-Bacon General Decision (FL20030017) was issued September 19, 2008. Davis-Bacon wage rates increased for Asbestos Workers, both insulator work and hazardous material, Bricklayers, Ironworkers, Glaziers, Painters, and Sprinkler Fitters. There were no decreases in labor rates.
- PT&I Cost** – Updates have been made to the PT&I information for estimated average markups for payroll taxes and Insurance for general contractors. See page 8 for updated information.

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## Material Costs

| SPEC/CONTACT                                                                                | MATERIAL     | MATERIAL Price per Unit                       |          |          | Material Index Composite |      | Note                       |          |           |
|---------------------------------------------------------------------------------------------|--------------|-----------------------------------------------|----------|----------|--------------------------|------|----------------------------|----------|-----------|
|                                                                                             |              | JUN 2008                                      | Qtr3     | SEP 2008 | Quantity                 | Unit |                            |          |           |
| 1                                                                                           | CONSTR EQUIP | 50 Ton Crane (weekly rental rate)             | 3,798.00 | 0.03     | 3,798.00                 | 1    | WK                         | 3,798.00 | 1         |
| 1                                                                                           | CONSTR EQUIP | Diesel Fuel per gallon                        | 3.98     | 4.38     |                          | 100  | Gal                        | 438.00   |           |
| 2                                                                                           | SITE WORK    | Asphalt Paving 1-1/2" Fine Type 3             | 9.87     | 0.15     | 9.82                     | 100  | SF                         | 982.00   | 1         |
| 3                                                                                           | CONCRETE     | 3000 PSI Ready-Mix Concrete                   | 111.80   | 1.00     | 112.80                   | 10   | CY                         | 1,128.00 |           |
| 3                                                                                           | CONCRETE     | Rebar, #1 Grade 60                            | 0.76     | 0.78     |                          | 300  | LB                         | 300.00   |           |
| 4                                                                                           | MASONRY      | Concrete Block, 8x8x16                        | 1.49     | 0.98     | 1.98                     | 400  | EA                         | 832.00   |           |
| 5                                                                                           | METALS       | Structural Steel, Multi-story                 | 1.44     | 0.90     | 1.74                     | 200  | LB                         | 348.00   |           |
| 5                                                                                           | METALS       | Shop Fabrication                              | 0.97     | 0.28     | 1.23                     |      |                            |          |           |
| 5                                                                                           | METALS       | Erection                                      | 0.87     | 0.10     | 0.87                     |      |                            |          |           |
| 6                                                                                           | CARPENTRY    | Steel Stud, 22 gauge, 3-5/8", 10' long        | 4.98     | 0.13     | 4.79                     | 200  | EA                         | 958.00   |           |
| 7                                                                                           | MOIST PROT   | Walk-up Roofing 3-ply 90 (30/30)              | 82.00    | 1.38     | 83.38                    | 5    | SQ                         | 218.00   |           |
| 7                                                                                           | MOIST PROT   | Fiberglass Insulation 3-1/2" R-13             | 0.41     | 0.03     | 0.44                     | 1000 | SF                         | 440.00   |           |
| 8                                                                                           | FINISHES     | Vinyl Composition Tile 18"                    | 0.88     |          | 0.88                     | 100  | SF                         | 88.00    |           |
| 9                                                                                           | FINISHES     | 5/8" Gypsum Board Type X (Sheetrock)          | 0.50     | 0.02     | 0.22                     | 1000 | SF                         | 220.00   | 1         |
| 9                                                                                           | FINISHES     | Ceiling, Acoustical Tile with suspension grid | 0.91     |          | 0.91                     | 150  | SF                         | 136.50   |           |
| 15                                                                                          | MECHANICAL   | 8" DIP Slip Joint Clean 350                   | 10.40    |          | 10.40                    | 25   | LF                         | 260.00   |           |
| 15                                                                                          | WELDING      | 2" Pipe, Sch. 40, A-53 Black                  | 7.50     | 1.35     | 7.85                     | 100  | LF                         | 785.00   |           |
| 15                                                                                          | SHEET METAL  | Galvanized Steel Ductwork, 22 gauge           | 0.90     |          | 0.90                     | 400  | LB                         | 360.00   |           |
| 16                                                                                          | ELECTRICAL   | #12 THWN-1916H Solid Copper                   | 0.11     |          | 0.11                     | 5000 | LF                         | 550.00   | 1         |
| 16                                                                                          | ELECTRICAL   | #10 Electrical Metallic Tubing (EMT)          | 0.93     | 0.03     | 0.98                     | 1000 | LF                         | 980.00   | 1         |
|                                                                                             |              |                                               |          |          |                          |      | Gross Composite            |          | 12,211.43 |
| Individual prices are not to be used for estimating. Prices are for index development only. |              |                                               |          |          |                          |      | KSC base adjustment Factor |          | 0.498     |
|                                                                                             |              |                                               |          |          |                          |      | Adjusted Material Index    |          | 6086      |

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## Summary – Cost Engineering Recommendations

- Based on previous charts and 50 years of estimating cost engineering experience
- June 7-27, 2004 For KSC construction projects use 10%\* for escalating for 2004, & 4% for 2005, and 2006 – but "Do a cost analysis and get quotes for major multi-year projects that are heavy weighted in concrete, steel Rebar (Reinforcing Steel), copper, asphalt, and aluminum". Also scheduling delays will cost extra for time escalation which must be considered.
- Some considerations in this percentage for escalation-labor up 7%, KSC materials up 18.8% 3/31/04, assuming 50% labor and 50% material would average 12.9%
- Other thoughts, concrete to go up 20%, rebar 20-40%, say 30%, steel 20-40%, say 30%
- However, past history shows 1971 increase of 13.8%, 1975 – up 11.8% and 1980 up 10.1%.
- This 10% for FY 2004 applies to previous construction estimates for future projects made prior to July 1, 2004

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## Cost Changes on Indexes

|      | ENR CCI |       | ENR BCI |       | TR-1511 |        |
|------|---------|-------|---------|-------|---------|--------|
| 1996 | 5.823   | 2.77% | 3.203   | 2.87% | 5.817   | 2.78%  |
| 1997 | 5.825   | 3.48% | 3.354   | 4.79% | 5.894   | 1.30%  |
| 1998 | 5.920   | 1.61% | 3.391   | 0.80% | 6.014   | 2.00%  |
| 1999 | 6.060   | 2.30% | 3.456   | 1.88% | 6.314   | 4.75%  |
| 2000 | 6.221   | 2.60% | 3.539   | 2.35% | 6.531   | 3.32%  |
| 2001 | 6.342   | 1.91% | 3.574   | 0.98% | 6.780   | 3.67%  |
| 2002 | 6.538   | 3.00% | 3.623   | 1.35% | 6.895   | 1.67%  |
| 2003 | 6.695   | 2.34% | 3.693   | 1.90% | 7.027   | 1.89%  |
| 2004 | 7.129   | 6.10% | 3.984   | 7.30% | 8.176   | 14.05% |
| 2005 | 7.444   | 4.23% | 4.205   | 5.26% | 9.054   | 9.70%  |
| 2006 | 7.751   | 3.96% | 4.369   | 3.76% | 9.959   | 9.09%  |
| 2007 | 7.971   | 2.75% | 4.485   | 2.58% | 10.446  | 4.66%  |
| 2008 | 8.318   | 4.18% | 4.697   | 4.50% | 10.860  | 3.82%  |

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KSC 9-08 Chg per Qtr 4.22%  
ENR 10-08 Annual Chg 7.3% Or Ave 5.75% Change