

IN-FIELD TRACK

WORKFACE PLANNING FROM A CONTRACTOR AND ENGINEERING PERSPECTIVE.

Speakers:

- Niels Frederiksen – Vice President, Jacobs
- Jose Herrero – Vice President, Fluor Canada
- Danny Daoust – President of Construction, CH2M Hill Energy Canada

Moderator

- Lloyd Rankin – President, Ascension Systems Inc.

Questions to the Panel:

1. With regard to front-end, what changes when you apply WorkFace Planning? (Note: - Based on our discussion the answer could include Path of Construction, when you bring on contractors, how you develop the EWP, CWP and FIWP the contract language, etc.)
 - Niels Frederiksen – Be cautionary as WFP is only one element of project delivery. If you don't have all of the other wheel cogs, the project will not be successful. The COAA WFP Committee was to use their past experience for constructors to work to a better plan. Turnaround for operating plant is at least a year ahead – scope of operations vs regulations. Once the scope is finished and procurement is done, packages are turned over to the planners who plan the work, front-end loaded so that when the plant is taken down, the down time is exact. Investment in success is at the front-end in turnaround. This is the element missing in the construction industry. FIWP process is not enough – need discipline with a gated program. 20 person team who travels (Construction Readiness Review) around country to establish scope – independent set of eyes to check the plan. Use color coding to show readiness. When work is planned, the components to execute plan are available on site.

- Danny Daoust – We need to use common sense. Start at commissioning, go to construction & engineering in DBM stage. EWP delivery may not suit CWP. Humans want to start building early because of the visual results but planning may not be done. Need heavy lift plan in place to accommodate lay down areas. When installing long pipe rack and EWP is by system, 80% may not be accurate because sequencing is not correct and it may not be possible to begin construction because material is not ready & available. Need a full vision early on and fit FIWP development into vision that is most economical for the project, not necessarily only engineering.
- Jose Herrero – The key is to optimize the plan. Influence engineering, construction & procurement such that the planning sequence that owner wants is in place. EPC process needs information fed into the Path of Construction from all to visualize plan. Construction needs in-house skill for construction sequencing to take lead and have meaningful conversations about how best approach for construction – modules, etc. WFP is the catalyst to force companies to follow normal steps but with more communication, solid execution plan & more integration between all parties involved. There needs to be practices, process & people to implement this execution – what is missing are the people who are trained consistently and there is a disconnect between processes & practices that needs refining. Avoid the path of least resistance and put in the effort.

2. With regard to project execution what changes when you apply WorkFace Planning? (Note: - Based on our discussion the answer could include using WorkFace Planners, how you deliver procurement and engineering, how you progress the project, the skill level of the workforce, etc)

- Jose Herrero – Once you have developed P of C, engineering sequence must be established to meet overall objective. There must be communication with engineering that may not be a natural communication. Work Breakdown Images – breaking plot plan into small portions. Make connection between P of C and Work Breakdown Images to get a better sense of meeting final target. Must include ISOs & materials in discussion.
- Danny Daoust – The biggest change in industry now is that supervision in the field is now at the workface with the people

doing the work rather than in the office planning. The pool of talent for supervision is still there but demand is greater. We are introducing new workforce that is relatively green and without adequate experience. WFP done right with FIWP correct including all information means we are able to execute the work under proper supervision because supervisor is not running around looking for missing items and following a correct process.

- Niels Frederiksen – 70% of foreman should be in the field with face to face contact with workers with a consistent approach to planning work that can transfer from site to site. Building a consistent approach will create a resource base to draw on. Interactive Plan in Jacobs brings all stakeholders in – procurement, warehousing – need to plan what is in the warehouse and how we will get it out. Need processes that work. Make people aware of the value to them that WFP will provide. Foremen initially feel threatened; however, change management process identifies behavior change to accept the WFP process. We need to explain the value to foremen of planners giving work packages and take feedback coming from foreman for future packages. The Constructability mandate is that a specialist must commit to go to site rather than sit in planning office.

3. With regard to the benefits and limitations of WorkFace Planning how can the application of WorkFace Planning benefit projects and are there any limitations to implementing WorkFace Planning that Owners, Construction Contractors, or Engineering Firms should be aware of? (Note: - The limitations could include issues relating to obtaining alignment, the fact that the model is still new and needs further development, that tools are just being developed to help with implementation, etc.)

- Niels Frederiksen -
 - i. Benefits – Software provides visualization which really impacts decision making & package implementation. Easier to plan scaffolding, commissioning (hydro test, etc)
 - ii. Limitations – amount of trained/educated people available (power users). Software systems that need to be integrated with other systems. Engineers must agree to update model regularly if integration is not possible.

- Danny Daoust –
 - i. Benefits – detailed plan that can be followed & executed – manage rather than react.
 - ii. Limitations – need right people involved in process. Project Manager needs to be there from beginning to end. Change management is reduced by getting the right people in place for better planning & less reaction time.

- Jose Herrero –
 - i. Benefits – Review Projects with different planning strategies to compare differences. When WFP is applied as it should be, the difference in productivity and budget was over 25% better. Globally recognized. Still a new process with limitations, but becoming recognized.
 - ii. Limitations – There are good work processes & practices; however, new technologies are not used properly for integration of construction & engineering processes. Model concept – in the old days, used a plastic model. Visualization makes it easier for planning & change management, for constraint planning & sequencing; however, training is needed.

Audience questions:

1. FIWP – Do you use that for a tool to control productivity? How is superintendent or foreman involved in FIWP planning?
 - Danny Daoust – We need the right people involved to make a plan that makes sense. You want more than a plan that looks good, it must be useable. Tie the FIWP into the estimate and earned man hours by activity. The man hours allotted to the package should be correct. General Foreman or Superintendent would be involved. Measure on a shift basis the hours earned or earned value against control budget.
 - Niels Frederiksen – Rough basis for hours; can use work face packages and use quantity survey for that. Packages are signed off by Superintendent, Quality, Warehousing before hand-off so that there are no punch items in packages. The sequencing is more

concise. There are no punch list items. Monitor progress & productivity separately from the packages.

- Jose Herrero – Asking people to track by FIWP is not precise. We found that information is not consistent so we need to track by system or area.

2. How do you align estimating, engineering, scheduling, workface planning with relation to the Organization Chart of each company?

- Jose Hererro - The function is important, not necessarily the name of the function. This is not a natural process. The Project Manager needs to promote alignment in these functions. Project Manager has to drive the planning process which is different than how projects have been planned before, independent of workface planning being used.
- Danny Daoust – Without alignment, there is no delivery. Take two projects with different execution strategy.
 - i. One owner took charge and used WFP – scheduling of EWP, contractor, materials management – everyone had authority and responsibility and the project was very successful.
 - ii. Another owner bought WFP from consultant but were not engaged and the success level was reduced. Misalignment is usually with the owner – if they are not bought in, there will be no success.
- Niels Frederiksen – If people responsible for incremental deliveries do not deliver on time with acceptance, there is where the breakdown occurs. There must be ownership of activities, deliverables & planning sequences. Requirements of each discipline must be understood. Independent team will come in and audit whether or not a project is ready for mobilization. Roles & Responsibilities are paramount.

3. What will be the best timing using WFP to get construction involved – definition of 80% engineered?

- Niels Frederiksen – 80% means mechanically engineered by system, not necessarily completion of total project. There is value in getting WFP involved early to build a concept and educate procurement. Packages cannot be completed until engineering is 80% done. The sequencing is critical. There is not one model that

fits all but it is necessary to use common sense and logistical planning.

- Danny Daoust – Start up & commissioning team should be involved early, but not all the time and the same can be said of construction. It's helpful to plan undergrounds and super modules on site – discuss and align conceptual plans early, then define detail later.
- Jose Herrero – When using a model, there is more success because you can check completion accuracy. % can be misleading and visually you can see what the actual progress is. WFP should be brought in from the very beginning to link drawings/materials so that the people in the field have all available to use when they start working – at DBM from a concept level.

4. From scheduling point of view in lifecycle of project, where is the proof that WFP does not compromise schedule?

- Jose Herrero - Planning is not an expense to the schedule and has not been detrimental
- Danny Daoust - Physical construction may not start at the same date but will end on the same date and affect amount of indirect cost.
- Niels Frederiksen - Backlog of packages and flexibility will provide ability to change sequence of work to accommodate unexpected constraints. There must be discipline and there must be sign offs, diligence in work area preparation, etc.