

## **Workshop Group 1: Co-Location Shmo-Location**

### Background

At the outset of the program, the decision was made to co-locate Conair's small engineering core team within the offices of one of the larger engineering service providers (also in Abbotsford). Co-locating is a common technique used on projects to facilitate communication, collaboration, and improve productivity within teams.

### Poor Team Performance Symptoms

#### Environment:

- 1) The co-location environment was a war-room of 5 desks and tables with whiteboards. There were 3 phones in the war room.
- 2) The war room was adjacent to the cubicle jungle where the engineering firm's engineers would work on the program
- 3) The water quality was poor, the coffee wasn't free, and heat and light were somewhat adequate if you mean it wasn't too cold but the room had no windows.

#### Co-Location Distractions

- 1) Often engineers on other programs would interrupt the RJ85 team with questions on their programs, the war room was almost a revolving door some days
- 2) Design review meetings seem to attract 'extra people' interested in the program but not working on it
- 3) RJ85 team members were pulled onto other programs at short notice, leaving the Conair core team scrambling to negotiate the permanence of staff on the team

#### Bait and Switch

- 1) Conair prepared solicitations for engineering services to this firm to assist with a rather large design and certification exercise. A quotation was prepared and agreed to; only then was it discovered that the resources to be assigned to this new work, were already doing other tasks to support the RJ85 program. This caused a several week delay in this part of the design.
- 2) From time-to-time certification tasks would come up requiring specialized resources to prepare test plans and communications with Transport Canada. Once committed, these resources were often pulled onto other programs and tasks were left half-complete with no one to finish them.

As the project manager, what would you do to inspire performance in this team setting?

### **RESULTS**

*Contributing Factors:*

- Poor environment
- Matrix org. problem
- Leadership issue
- Conflicting priorities

*Impacts:*

- Productivity low
- Schedule will slip
- Conflict between Conair and vendor
- Poor Quality
- Unstable Planning

*Metrics*

- % tasks complete
- Staff satisfaction
- Issues raised to steering committee

*Performance Inspiration Techniques*

- Appoint PM and/or PE
- Identify, prioritize tasks
- Proper work environment
  - Relocate to cubicles
  - Off-site?
- Is there sufficient benefit to co-location?
- Establish/review schedule
- Escalation path for resolution by senior mgmt. In Conair and vendor
- Steering committee senior rep from Conair and Vendor
  - Reconfirm terms of reference and joint objectives

o charter

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## **Workshop Group 2: Supplier Woes**

Departing from the traditional 'build-in-house' approach to converting aircraft to air tankers, Conair elected to hire an aerospace manufacturing management firm (AMM) to coordinate the manufacturing and delivery of many key assemblies for the retardant tank. While the tank design used common materials and manufacturing processes well understood in the aerospace industry, the overall large size of the tank skins themselves posed a problem for one sub-contractor (SC), buried somewhere deep in Michigan State.

This Sub-Contractor (SC) was realizing <30% success rate on manufactured parts that required repeated machining, rolling, and stress reduction cycles within extremely tight tolerances. There is a risk that the sub-contractor could throw in the towel and quit.

The slow delivery of SC parts delayed assemblies being manufactured by a Large Aerospace Manufacturer in Oklahoma (LAO). Conair was fortunate that LAO was willing to even take on the manufacturing of these parts because of the low volume. Conair is building 3 tanks; LAO is used to manufacturing 1000's of parts for companies like Boeing and Airbus. There is a risk that LAO might drop the program as well.

All of this manufacturing and procurement was managed by AMM. Just your luck, SC is right in the critical path for retardant tank assembly and installation; in fact, the critical path for your entire schedule. Each week that key parts don't make it to LAO, translates into a week of delay in the overall schedule.

As the project manager, what would you do to inspire better performance in this team setting?

### **RESULTS**

#### *Contributing Factors:*

- Constructing unique items
- Lack of qualified contractors?
- Relationships not well developed btw all parties

#### *Impacts:*

- Delays in Schedule
- Loss of Key Suppliers
- Increased Cost

*Performance Inspiration Techniques*

- Review contract and possibly renegotiate
- Review design → Input from SC's on Design
- Collaboration BTW SC and LAO to Assess Critical Path
- Re-Use Design to benefit SC's
- More Physical Presence and direct communication
- Regular meetings with all parties

## **Workshop Group 3: Contractors vs. Employees, Performance Optional**

As stated in the background presentation, Conair hadn't taken on an extensive air tanker development program in 30 years. Armed with a small core of engineers and one bright-eyed, naïve project manager, the team set off on building an extension of the core team to make this project successful.

Over 150 different people worked on the program representing 50+ contracted engineering firms, manufacturers, independent delegated engineers and certification agents, test labs, and a large manufacturing management firm. Team members operated in 3 countries and 5 time zones. Each had a small (sometimes large!) part to play in delivering the overall program.

Virtually everyone is a contracted resource, including you, the project manager. While the project was certainly exciting and everyone was pleased to work on it, that wasn't enough to gain the 110% commitment that we as project managers expect from team members to ensure success.

All contractors were provided a scope of work with deliverables and due dates. Many did not deliver on time. Some were victims of too-much work, dependence on other contractors who were late in delivering, or being too large a firm and the importance of the RJ85 air tanker program was lost by management in the contracted company to give it the attention it needed.

On occasions too numerous to count, the small band of employees lamented at the decision to not 'staff-up' more prior to the program.

Not everyone cared about delivering the RJ85 air tanker on time and budget like the core team.

With such a large base of contractors, what would you do as the project manager to inspire performance in this large, segregated, environment?

### **RESULTS**

#### *Contributing Factors:*

- Large Team
- Geographically dispersed
- All contractors
- Different degrees of importance/ priorities – contractors
- Segregation of Core team / contractors
- Sheer complexity
- Inexperience
- Ineffective Corporate Sponsorship

- Are contractors full-time on project?

*Impacts:*

- Morale / Unmotivated
- Overworked
- Challenging communications
- Mis-aligned objectives project vs. business
- o Various levels of commitment
- Cost, Schedule overruns
- Quality?
- New program – new processes
- Lack of trust
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*Performance Inspiration Techniques*

- Change Management – Awareness – RACI
- Scrums
- Check assumptions w/ team
- Shared Objectives
- Technology to connect geography
- Inspire ID Leadership/Engage Sponsor
- Team building within the groups and across
- Focus on vision/agreement of objectives → commitment
- Acknowledging successes of teams in a meaningful way
- Education
- o Understand dependencies
- o Celebrate milestones
- o Process improvement
- Measurement & Monitoring

- Escalation Process
- Establish employee / team engagement
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## **Workshop Group 4: The Never Ending Analysis**

Developing any aerospace product requires more analysis than anyone cares to fathom. Installing a simple cockpit door requires dozens of hours of analysis to analyse every material, fastener, and position of the door to ensure that it will be safe in flight conditions and every obscene type of flight (including crashes) that it might possibly see in its lifetime.

Now, imagine an entire tank system with over 3000 parts and assemblies, thousands of connections, each having to be analysed through over 100 different 'load cases'.

On top of that, throw into the mix, that this analysis work is being carried out by sub-contractors on two continents, 5 time zones apart, with varying degrees of experience and knowledge, some of whom, you've only talked to over the phone.

Also, this analysis is being done by engineers, and every stereotype of engineering trait you know, both good and bad, worked on this project. Some engineer's reports required for certification numbered in the 800 page range. Some reports were only 3 pages. Every one of them was delivered late.

As a project manager, not familiar with aerospace engineering, you are completely at a loss as to how to challenge engineers on their deliverables. Are they spending too much time? Sure seems like it, but everyone you try to talk to, explains carefully and at the most obscure and incomprehensible detail, that what they are doing is required and cannot be trimmed down in the least.

You are in a real predicament. The analysis is also dependent on other analysis, a chain of delay that continues to cascade. The schedule continues to slide as the analysis carries on in a seemingly utopian clatter of keyboard and calculator clicks. This is not a nightmare, it's real. It's killing your schedule and ruining your budget.

As a project manager, what would you do to inspire performance in this team setting?

### **RESULTS**

#### *Contributing Factors:*

- Different styles
- Geo-diverse / multi time zones
- Diversity of disciplines
- Lack of common reporting and standardized specs/cohesive integrated project plan

#### *Impacts:*

- Ongoing schedule slippage

- Cost overruns
- Risk, Scope and Quality uncertain results in further cost
- Potential opportunity loss to Conair if significant further slips
- Unclear on progress
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### *Performance Inspiration Techniques*

- Organize into logical sub-team
  - o Eg. Engineering discipline
  - o Geo/time zones/culture
  - o Build up effective teams
    - - sub-groups → tight, co-located/ visited
    - Integrated program management
- Each group needs strong leadership and central point of contact in each group
- Planning and executing cross-team dependencies and deliverables
- Standardized project reporting
- One program office serving across overall program
- Plan for What if → Plan B
- Disciplined Risk Management
- Define quality assurance plan / standards
- Define standardized specification template
- Measure
  - o Project schedule process
  - o Earned value management
  - o Quality plan
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## **Workshop Group 5: “Side Fairing Departed in Flight”, Unexpected Setbacks**

On August 28, 2013, during a high speed certification test flight over the wilderness west of William’s Lake, a portion of the upper side fairing departed in flight. There were no injuries, but there was damage to the tank and other fairings. The aircraft returned to Abbotsford without further incident.

This is not supposed to happen, even in R&D aircraft. Especially not after all of the analysis was done, the months of design, the labour intensive installation and pains to get the parts made correctly and conservatively designed against failure. Never mind the intensive QC and QA program in place. How could this happen?

At the time of the incident, engineers had been working on this program for 2 years, with little breaks for R&R. We were finally in flight test and the light was at the end of the tunnel. The blow to morale was impressive.

An extensive incident analysis was completed, new parts were designed (even more conservative and heavier); installation completed and flight testing resumed. Fortunately, there was no further incident and certification flight testing completed successfully in October.

This incident, however, caused a 4.5 week delay to the program. Under normal circumstances, this kind of ‘repair’ would have taken less than half that time. But this was not a normal circumstance; the team was tired, overworked, and ‘something’ fell through the cracks. As I have learned through the incident investigation process, there are multiple factors that contribute to a failure, as was this case.

As the project manager, what would you do to inspire performance in the face of a sudden and unexpected setback?

### **RESULTS**

#### *Contributing Factors:*

- Overworked and tired (>2 year project)
- Manufacturing change initiated at plant – for convenience
- Engineering approved change without appropriate review
- Component failed during operation
- Lack of oversight with this kind of change process
- Took too long to fix problem (4.5 week delay)

#### *Impacts:*

- Lack/loss of trust in people – finger pointing
- Delays
- Outsourcing, permits regulator
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### *Performance Inspiration Techniques*

- Identify the root cause
- Fix the process that oversees design changes
- Engage team in a facilitated workshop to explore ideas for a solution
- Team is part of the process
- Engagement – team building
- Break from the routine
- Watch out for the quick-fix
- Celebrate the successes
- Face-to-face meetings
- Review communication plan
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## **Workshop Group 6: Meltdown and Burnout**

As stated in the background presentation, Conair has a small core of engineers responsible for design and certification of the RJ85 air tanker. Supported by dozens of contractors but faced with many setbacks and delays, the core began to show signs of weakness after several months. The excitement of a new challenge to build a Next Generation Air Tanker was long gone and what remained were the seemingly endless weekly setbacks in delays, mistakes, and changing regulatory requirements. The team had become overburdened to put it mildly.

First, jokingly referred to as ‘tweaking’, the chief systems engineer began to exhibit a higher than usual amount of sarcasm and impatience with employees and contractors. Second, the lead designer began to lose patience with contractors responsible for installation work that was not being done according to the drawings. Third, the chief structures engineer began to show signs of ‘giving up’ and complaining about things that normally would be a fun challenge. The senior analyst responsible for supporting the dozens of contract engineers performing analysis began to keep strange hours, work from home, and further isolated himself from the team. Finally, the department head and a senior structures engineer himself began to lose focus on the RJ program and began to entertain more of his time in other projects, one of which was becoming a higher priority than the RJ program.

The small team was burning out and melting down.

Shutting down for two weeks is not an option. The project sponsor and other senior executives debated this option. The contract was signed by now with the USFS and we had to deliver an aircraft on time. The pressure was not letting up at all.

As the project manager, what would you do to inspire performance in this team setting?

### **RESULTS**

#### *Contributing Factors:*

- Lack of Communication
- Lost Confidence
- Disengaging
- Lost Support
- Lack of Collaboration
- Moving Targets
- Lack of Formal Project Process

#### *Impacts:*

- Missed Deadlines

- Quality Suffers
- Loss of Continuity
- Rework for Scope / Deficiencies
- Cost Over-runs
- Risk of Project Cancellation

*Performance Inspiration Techniques*

- Team Building
- Clarify Roles & Responsibilities
- Establish Project Protocols
- Re-Alignment of Priorities
- Identify Road Blocks; engage Team towards solving
- Identifying Action Items & Responsibility & Timelines
- o Establish Clear Project Plan
- Celebrate Milestones
- Re-Engage Project Sponsor
- o Establish/Assign Project Champion
- Follow Change Mgmt. Process
- Dedicate Project Team Members