Manufacturers Alliance
Sharing Education & Resources Peer to Peer

PRESENTS

EDUCATIONAL SEMINAR
Lean Product Design

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LEAN PRODUCT DESIGN & DEVELOPMENT PRACTICES AT STARKEY HEARING TECHNOLOGIES

MANUFACTURERS ALLIANCE

May 9, 2019

Steve Stucky

Starkey Hearing Technologies

OUR VISION

"Better today than yesterday… Better tomorrow than today."

OUR MISSION

"To serve our customers better than anyone else."

OUR PURPOSE

"So the World May Hear"

STARKEY FACTS

PRIVATELY HELD COMPANY:
Decisions based on what's best for the patient and our customers

QUALITY:
The largest hearing aid manufacturer in the United States

EXPERIENCE:
The average tenure of a Starkey employee is 14 years

TALENT:
Employing more hearing aid professionals and audiologists than any other manufacturer

VALUES BASED ORGANIZATION:
Always striving to do what is right for our customers

OVER **5000** employees

Doing business in over **100** COUNTRIES

22 GLOBAL FACILITIES

COUNTLESS LIVES IMPACTED

Starkey
Hearing **Technologies**

Global Headquarters

Eden Prairie, Minnesota

Employs 1,600 on campus

Products: Standard Hearing Aids, Custom Hearing Aids, Accessories, and Mobile Apps.

A MENTAL MODEL FOR LEAN PRODUCT DEVELOPMENT

Pipeline Layer — Force Ranked Project Priorities and Aligning Cross Functional Resources

Practice Layer — Utilizing Agile Practices and Visual Management coupled with Facilitated Events to Increase Team Effectiveness & Accelerate Project Work

Process Layer — Deliverables, Project Scope, the Work of the Project. Includes Reducing & Removing Waste, Queues, & Bottlenecks in the Development Process

Goal: Front Loading Product Development Resulting in More Effective Teams, Faster Time-to-Market Cycles, Improved Project Results

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WHY IMPLEMENT LEAN PRODUCT DEVELOPMENT?

Lean PD Gains Applied to Reduce Time-To-Market

- - - ▶ Before
——▶ After

Number of New Products In The Development Pipeline

Improving product development flow results in more projects being completed in a given amount of time.

Time

Total Revenue Vitality Rate

Current State   Future State

■ Existing Products, Existing Markets
■ New Products, Existing Markets
■ New Products, New Markets

"Vitality Rate" measures the health of the delivered new product pipeline in revenue % terms

Vitality Rate Metric Measures the Health of the Product Development Process

4

LEAN-PD GOAL: RESOURCE PRODUCTIVITY

Industry Study of Hours / Day Spent Creating Value (Informal study of 10 Industries)

	Hours of Value	Hours of Enablers	Hours of Waste
	1.7 Hours	3.4 Hours	2.9 Hours

Current State	Value-Added	Enablers	Waste
Future State	Value-Added	Enablers	Waste

Value-Added
- Work internal & external Customers are willing to Pay for – Essential Project Work

Enablers
- Non-Value Added But Currently Necessary Work

Waste
- Non-Valued Added & Not Necessary Work

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LEAN PRODUCT DEVELOPMENT AT STARKEY

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ACCELERATION EVENTS & VISUAL MANAGEMENT

G1: Project Initiation   G2: Concept/Feasibility   G3: Project Plan & Busn Case   G4: Verified Design   G5: Production Readiness

Knowledge-Based Development

Learning Cycle Event(s)

Concept Review & Freeze Event

Critical Review & Freeze Event

Final Review & Freeze Event

Market Requirements Event

Project Planning Risk Mitg'n Event

Visual Workflow Management

Design 3P Event

Process 3P Event

Production 3P Event

Production Process Preparation (3P)

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THE "PARM" SCHEDULE DEVELOPMENT METHOD

PaRM's replace the traditional way of developing project schedules

From: A series of meetings looking at Project Gantt Charts..

To: A focused, active day-long team based event.

Win-Win Approach: Schedules are created in a fraction of the time & with higher quality results.

	Week 1				
	M	T	W	Th	F
8:00					
9:00					
10:00					
11:00					
12:00					
1:00					
2:00					
3:00					
4:00					
5:00					

PaRM Event

PaRM's <u>Significantly</u> Increase the Efficiency, Speed, and Quality of Schedule Development

THE "PARM" SCHEDULE DEVELOPMENT METHOD

Typical Agenda
1. Review Charter as a Team
2. Develop a list of Deliverables by Function
3. Build a Deliverables Based Visual Project Plan,
4. Determine Precedence Relationships as a Team
5. Determine Resource Availabilities & Duration Estimates
6. Compress the Schedule as a Team
7. Identify and Prioritize Risks & Mitigation Actions

Project Planning Using "Swim Lanes" approach.

Not the same as network planning!

Currently 2/3 of all projects are planned using this method – Increasing monthly.

Process is new to Starkey, with the first PARM held in early 2018.
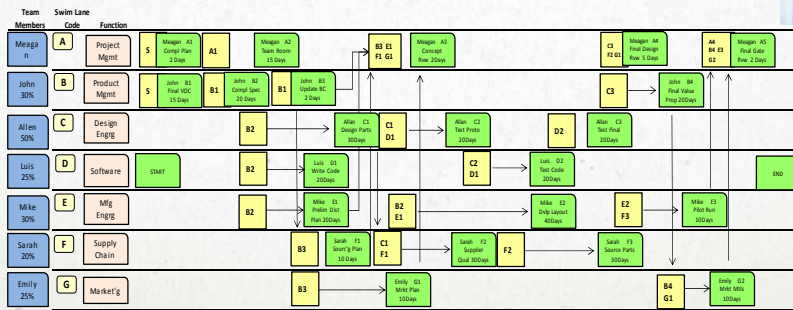
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PARM EXAMPLE

PARM EXAMPLE

SCHEDULE COMPRESSION

Schedule Compression Process:
- Viewing the Critical Path as a team, discuss opportunities & assumptions and determine ways to reduce schedule
- Capture assumptions & agreed upon schedule changes.
- Update changes in MS Project
- Repeat until compression results are minimal or goal is met.
- Estimate Confidence Interval for compressed project schedule as a team.

Schedule Compression Methods:
1. Early Start
2. 'Parse' High Duration Activities
3. Reduce Duration Estimates

The First Schedule is Never Right.
Compression Must be a part of the Event
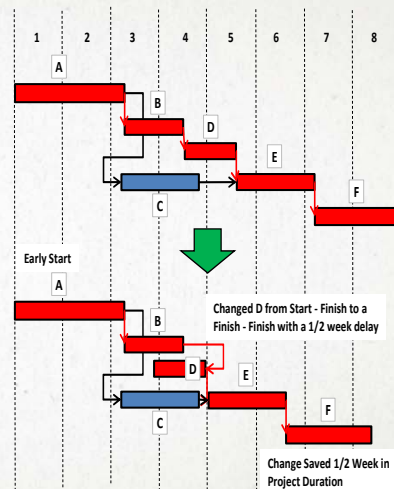
SCHEDULE COMPRESSION

During Compression Activity...

- Capture task level changes on white board and all assumptions, especially for duration reductions

Project Compression Facilitation   **Target Launch Date**   **1-Nov-19**

		Launch Date before Compression	**15-Dec-19**
Task #	**Change Description**	**Effect of Change**	**Launch Date**
15	Early Start - Chg to Finish-to-Finish with a 10D Delay	20D to 10D Critical	5-Dec-19
22	Early Start - Removed Predecessor Task 21	Removed from Critical Path - 15D	20-Nov-19
33	Parsed Long Duration Task of Non-Critical activity 8D from 20D activity	Reduction of 8D	12-Nov-19
39	Reduced Duration by 5 Days (Assumption #1)	10D to 5D	7-Nov-19
42	Early Start - Chg to Finish-to-Finish with a 3D Delay	12D to 3D	29-Oct-19
47	Reduced Duration by 7 Days (Assumption #2)	20D to 13D	22-Oct-19

#	**Assumptions**	**Resource**	**Owner**
1	Resource availability will be dedicated to this activity for this time frame. Other work will be reallocated	Mfg Engrg	PM
2	Expedite Materials for Production Build from Key Suppliers	Supply Chain	SC

- Get Confidence Interval estimate from team (Generally 50% to 80% depending on the amount of compression)

ASSESSING SCOPE WITHIN A PARM EVENT
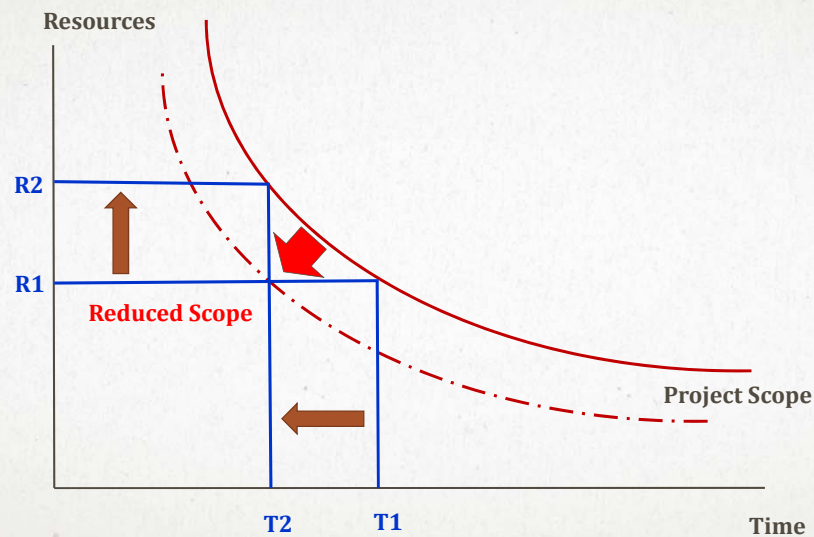
RISK IDENTIFICATION & MITIGATION

Risk Identification:

- Brainstorm Project levels Risks as a Team.

- Identify Probability & Occurrence for Each Risk after Brainstorming

- Sort Risks by Highest RPN (Probability X Impact)

Mitigation Actions:

- Determine Risk Strategy for High RPN Risks (Avoid, Transfer, Mitigate, Watch, Accept)

- Brainstorm Actions which could be taken for high RPN Risks with Mitigation, Transfer, & Avoid risk strategies

- Assign Ownership & Target Due Dates

Make Risk Mitigation actions visible to keep work progress in front of the team

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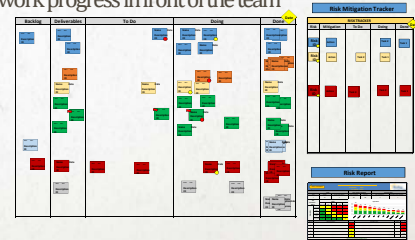
VISUAL MANAGEMENT APPROACHES

Different Boards for various uses:

Board Type	Application
Team Room Visual Wall	Larger Projects / Cross Functional Teams Longer Durations
Multi-Project Board	Smaller Projects or a Department for tracking work across multiple projects by a team
Cadence Board	Multiple Smaller Projects in "Swim lanes" with Key Performance Indicators, Project Status, Schedule, and Actions
Kanban Board	Pull System for Smaller Assignments Ideal for Sustaining Activities
Pulse Board	Functional Alignment & Reporting Board Excellent for Top Management Reporting of Issues

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TECHNOLOGY PROJECTS AND PROGRAM DEVELOPMENT

Technology projects "Push" the maturity of technologies to meet Program dates

Programs publish the latest target dates to "Pull" technologies in which protect Program success

Mature Technology Levels

Technology Projects

Tech #1 Date   Tech #2 Date

Program 3

Tech #1 Date   Tech #2 Date   Tech #3 Date

Program 2

Tech #1 Date   Tech #2 Date

Program 1

KEY: Definitions of Technology handoffs are to be clearly communicated to align Program integration work requirements

Technology delivery dates are Program Milestones where hand-offs occur for needed features & capabilities included in hardware, firmware, & software .

LARGE PROJECT VISUAL MANAGEMENT STANDARD

STANDARDS FOR PROJECT REPORTING

Product Cost Report

Purpose:
- Product Cost Details

Content:
- 4 Months - Cost vs Goals
- Source of Estimate
  - ROM Estimate (Team)
  - Pre-Production Quote
  - Production Quote
- Top Parts Driving Costs
- Breakout of Material, Labor & Overheads

Project Dashboard Report

Purpose:
- Displays Top Level View of Project Metrics vs Goals

Content:
- Metrics (G / Y / R)
- Milestones
- Gate Dates
- Product Costs
- Project Costs
- Risks & Issues

Project Cost Report
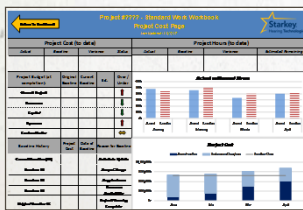
Purpose:
- Project Cost Goal, Actuals & Forecasts

Content:
- 4 months - Cost vs Goals
- Breakout of Components of Project Cost
  - Capital
  - Expense
  - NRE Hours

Schedule / Milestone Report
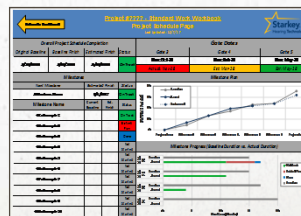
Purpose:
- Schedule Details

Content:
- Gate Dates (Plans vs Actual)
- Milestone Cumulative Chart
- Milestones (Plans vs Actual)

MULTI-PROJECT CADENCE BOARD

Effective Way to Manage Multiple Projects Which Follow a Similar Set of Milestones

Common Milestones for Tracking Progress to Completion. (Actual vs Planned Dates)

Task Tracking by Resource for Current Activity

Backlog of Projects in Priority Order

Active Projects in Priority Order

Key Information:
- Project Name
- Project Leader
- Priority #
- Objective
- Planned Start
- Actual Start
- Date Required
- Overall Status

Issues Highlighted
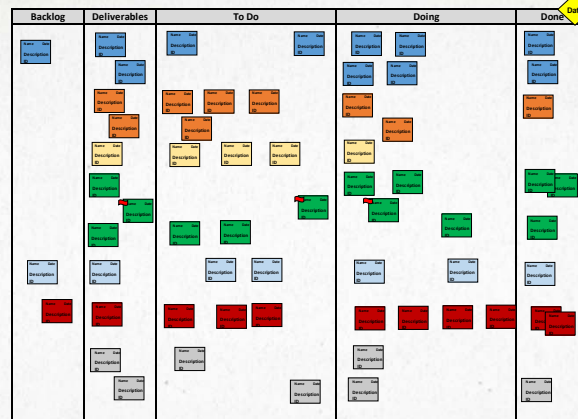
Y – At Risk
R – Needs Help
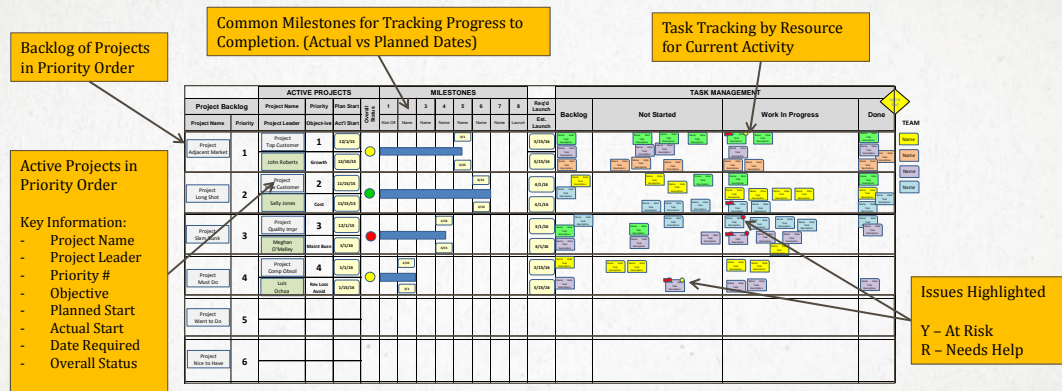
Visual Workflow Management with frequent stand-up meetings

Active projects are currently less than ½ the average time from open to close compared to 1 year ago

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INTEGRATING WATERFALL & AGILE

Gantt Chart: Deliverables / Key Activities Level

Sprint / Scrum for Task Management

Updated Gantt Chart: New Critical Path / Deliverables for Next Sprint

Waterfall	Continuum	Agile

START OF SPRINT

High Level Project Plan with Critical Path

Sprint Task Board with Tasks and Ownership Linked to Project Plan

Tag

Name	Date

Description of the Work to be done

ID

Currently 20 departments are involved with Visual Management practices.

All are assigned a unique tag color which is standard throughout the business

Waterfall	Continuum	Agile

DURING THE SPRINT: RUNNING THE SCRUM MEETINGS

Standard Data Tag

Critical Path Task

"At Risk" Task

Blocked Task / Help Needed

| Waterfall | Continuum | Agile |

END OF SPRINT: SPRINT REVIEW / REFLECTION
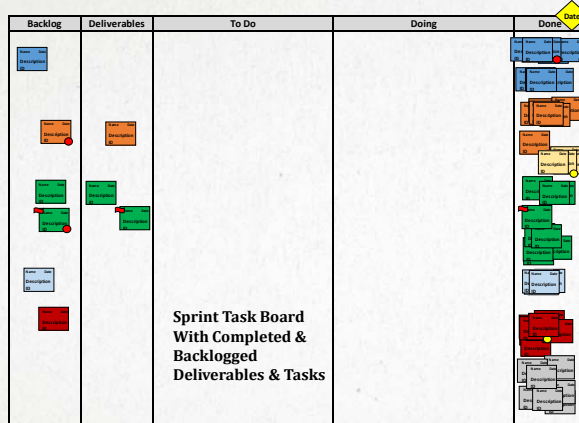
Project Plan is updated by the team at end of Sprint

Sprint Task Board With Completed & Backlogged Deliverables & Tasks
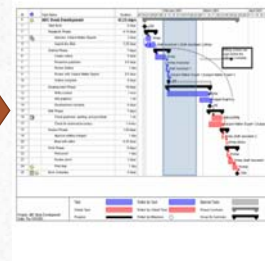
Fast-Tracking & Schedule Crashing is done as required to maintain the overall schedule

End of the Sprint:
- Team evaluates the work completed vs plans, adjusts the Gantt Chart & Critical Path
- Team conducts a Sprint Review with Sponsors
- A Sprint Retrospective is held by the team for continuous improvement purposes (+ / deltas)

THE STAND-UP MEETING

Short in Duration & Focused...
Respecting Peoples Time is Key!

Stand-Up Meeting Agenda

- **Critical Path Items / Support Discussion   (Red Flag Deliverables)**
- **Issues Update - Who is Blocked / has Issues & not on Critical Path**
- **Rest of Team Updates   (At the Board)**
  - *What has been done between this stand-up & previous stand-up?*
  - *What will be done between this stand-up & the next stand-up?*
  - *Are there any other issues?*
- **Any Additional Risks / Concerns from any Team Member**

Urgency	Frequency	Situation
Critical	2 times per Day	Emergencies, Fire-Fighting, Just prior to Launch
Very High	Every Day	Projects behind schedule and may need a large amount of coordination
High	3 times per Week	Typical projects with high schedule pressure
Low	2 Times per Week	Projects with lower schedule pressure or lower priority

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MY LESSONS LEARNED FROM LEAN PRACTICE IMPLEMENTATION

- Implement changes at the pace the organization can adopt
  - Not "Too Much, Too Soon"

- Focus on the quality & speed of stand-up meetings
  - Value-Add time spent by teams drives adoption

- Continuous Improvement of Visual Management Standards
  - Identify what's working & what isn't working
  - Benchmark, experiment, iterate, & improve

OPPORTUNITIES AHEAD…

- Broadening adoption of acceleration events beyond PARMs
  - Market Requirements Events / Rapid Learning Cycles
- Utilizing Visual Management for Leadership Updates / Reviews
  - Lean project reporting – Value Add for teams & leadership
- Further improvements in Value Add time spent in events & stand-ups
  - "Raising the Bar" through competency development & coaching

THANK YOU

MANUFACTURERS ALLIANCE

STEVE STUCKY

Thank you for joining us!