MANUFACTURING INSIGHTS

Lean Product Development

SCENE 1.

CG: FBI warning

white text centered on black to blue

gradient

SCENE 2.

NARRATOR (VO:

MANUFACTURING INSIGHTS, MANUFACTURING

ENGINEERING MAGAZINE'S VIDEO SERIES FOR

PROCESS IMPROVEMENT. THIS PROGRAM WILL

EXPLAIN THE BENEFITS AND METHODS OF LEAN

PRODUCT DEVELOPMENT.

SCENE 3.

MANY FIRMS THAT HAVE IMPLEMENTED LEAN

MANUFACTURING HAVE RECOGNIZED THAT THE

CONCEPTS OF LEAN THINKING MUST MOVE UPSTREAM

INTO THE PRODUCT DEVELOPMENT PROCESS TO

OPTIMIZE MANUFACTURING COST AND CUSTOMER

VALUE.

SCENE 4.

THIS VIDEO WILL EXAMINE HOW THE PRODUCT

DEVELOPMENT PROCESS CAN SUBSTANTIALLY BENEFIT

FROM THE APPLICATION OF LEAN PRINCIPLES AND

METHODS.

SCENE 5.   **NARRATOR (VO)**

WE WILL TALK WITH TWO EXPERTS IN LEAN PRODUCT

DEVELOPMENT WITH DIFFERENT BUT SYNERGISTIC

PERSPECTIVES ON THIS IMPORTANT TOPIC. MICHAEL

KENNEDY, WHO IS FOUNDER AND CEO OF TARGETED

CONVERGENCE CORPORATION,

SCENE 6.   **NARRATOR (VO)**

AND RON MASCITELLI, WHO IS PRESIDENT OF

TECHNOLOGY PERSPECTIVES.

SCENE 7.   **NARRATOR (VO)**

THEN WE WILL LOOK AT HOW TWO DIFFERENT FIRMS

HAVE MOVED FORWARD WITH THE IMPLEMENTATION OF

LEAN PRODUCT DEVELOPMENT.

FIRST, AT TELEDYNE BENTHOS WHERE LEAN PRODUCT

DEVELOPMENT HAS BEEN ALL ABOUT KNOWLEDGE-BASED

DEVELOPMENT,

SCENE 8.   **NARRATOR (VO)**

AND THEN AT CARLETON LIFE SUPPORT, WHERE THE

EMPHASIS HAS BEEN ON TACTICAL AND PRACTICAL

TOOLS TO ACCELERATE DEVELOPMENT PROJECT

EXECUTION.

SCENE 9.   AND FINALLY, WE WILL PROVIDE SOME

RECOMMENDATIONS FROM THE EXPERTS ON HOW TO

MAKE A LEAN PRODUCT DEVELOPMENT IMPLEMENTATION

WORK FOR YOUR FIRM.

-- TOUCH TO BLACK --

SCENE 10.

Factory scene

<u>NARRATOR (VO)</u>

LEAN PRODUCT DEVELOPMENT BEGINS WITH THE FIRST
GLIMMER OF A NEW PRODUCT IDEA, AND ENDS WITH
THE SUCCESSFUL LAUNCH OF A NEW PRODUCT INTO
FULL PRODUCTION.

WHAT MAKES THIS APPLICATION OF LEAN PRINCIPLES
SO CHALLENGING IS THAT NEW PRODUCT DEVELOPMENT
IS A COMPLEX, VARIABLE, AND MULTI-DISCIPLINARY
BUSINESS PROCESS.

SCENE 11.

<u>NARRATOR (VO)</u>

TO BE SUCCESSFUL, LEAN PRODUCT DEVELOPMENT
MUST ADDRESS BOTH THE STRATEGIC AND TACTICAL
ASPECTS OF THE PROCESS – HOW A FIRM'S
KNOWLEDGE AND LEARNING CAN BE HARNESSED IN THE
MOST EFFECTIVE WAY, AND HOW DEVELOPMENT TEAMS
TRANSFORM THAT KNOWLEDGE INTO SUCCESSFUL AND
PROFITABLE NEW PRODUCTS.

SCENE 12.

KENNEDY:

I don't like the term lean, to be honest with you, because most people think in terms of lean production practices like value stream mapping and the typical "let's look at a product development process, or office process, or a production process, and let's remove the waste out of it." So I'm going to keep switching the gears a little bit and call it knowledge based development. So when I go look at the key principles between knowledge based development, it's more in context that product development is not so much about developing individual products, but is developing the knowledge about the products. As Alan Ward used to say, it's the way Toyota thinks, they don't think they make great products, they think they make and generate great knowledge, and the great products just flow from the interaction of that knowledge.

SCENE 13.

MASCITELLI:

Lean product design is obviously, because it's part of the lean enterprise philosophy, it's all about eliminating waste. Waste in the context of product development means wasted time, wasted product cost, or wasted opportunities. So the goal in lean product design is to identify waste wherever it resides in product development, and use some of the traditional tools of lean, as well as some of the new tools and methods, to attack that waste and eliminate it. In many companies' cases that can be a very significant competitive factor, so it's a real opportunity for companies. No one benefits from waste. The customer doesn't benefit, the company doesn't benefit, and certainly the workers don't benefit.

SCENE 14.   **NARRATOR (VO)**

THERE ARE A SEVERAL REASONS WHY DESIGNERS AND

ENGINEERS MAY BE SKEPTICAL ABOUT THE

APPLICABILITY OF LEAN PRINCIPLES TO THE

CREATIVE WORK OF NEW PRODUCT DEVELOPMENT. IN

PARTICULAR, IT IS COMMON FOR DEVELOPERS TO

FEAR THAT STEPS TO SLASH WASTE WILL SOMEHOW

STIFLE CREATIVITY AND INNOVATION.

SCENE 15.   **MASCITELLI:**

Stifling creativity is one of the great fears of applying lean to the product development world. But that comes out of a misconception that we're going to use the lean manufacturing idea of standard work and structure and commonality in a very heavy-handed way. Standard work has its place in product development, but the place is very different. It comes down to standardizing communication, standardizing documents, having more flexible templates and guidelines. Design best practices, for example. They're not, again, followed in a regimented and dogmatic way, they're used as a guideline to create kind of an area of goodness in which teams can flexibly maneuver. So the goal is not to standardize work in product development, or do some of the other heavy-handed lean things. The goal is simply to identify waste that is unambiguously wasteful, to free up more time for creativity, more time for innovation. That's really the ultimate goal.

SCENE 16.

<u>KENNEDY</u>:

There is no logical reason why it would hurt innovation. It's just a matter of how you apply it. Innovation is generating knowledge. As long as your innovation is about building products from increasing body of knowledge, it helps innovation. If you look at Toyota, their success, they have some great, innovative products, like the Prius, when they moved into the Lexus. So they have great breakthrough innovations. But what they're really about is continuous knowledge creation on better brake systems, better parts of the car. Every model year they keep developing new technologies and innovative ways to advance the subsystems. They don't really think of developing top down cars, they think of developing cars from the bottom up.

SCENE 17.

- IMPROVED TIME-TO-MARKET
- MORE PROJECTS COMPLETED WITH THE SAME WORKFORCE
- HARNESSING OF THE FIRM'S KNOWLEDGE TO BUILD ON PREVIOUS SUCCESSES
- RAPID EXECUTION, ENABLING BETTER

NARRATOR (VO)

THE ELIMINATION OF WASTE IN NEW PRODUCT DEVELOPMENT CAN RESULT IN SUBSTANTIAL BENEFITS.

THE MOST OBVIOUS IS IMPROVEMENT IN TIME-TO-MARKET. IN FAST-MOVING INDUSTRIES, INCREASED SPEED AND RESPONSIVENESS ARE CRITICAL TO MEETING THE MARKET'S NEEDS AND ENSURING COMPETITIVENESS.

HOWEVER, THE BENEFITS GO FAR DEEPER. BY ELIMINATING WASTE FROM THE PROCESS, FIRMS CAN COMPLETE A GREATER NUMBER OF SUCCESSFUL PROJECTS IN THE SAME TIME, THEREBY MAXIMIZING THE REVENUE AND PROFIT THAT CAN BE GENERATED WITH THE SAME WORKFORCE.

FURTHERMORE, BY EMPLOYING KNOWLEDGE-BASED DEVELOPMENT METHODS AND LEAN PROJECT EXECUTION TOOLS, EACH NEW PROJECT BENEFITS FROM THE LAST, RESULTING IN AN EVER-INCREASING COMPETITIVE ADVANTAGE.

A CULTURE OF LEAN THINKING IN NEW PRODUCT DEVELOPMENT MEANS THAT BOTH THE KNOWLEDGE OF THE FIRM, AND THEIR ABILITY TO RAPIDLY APPLY THAT KNOWLEDGE, IS SIGNIFICANTLY IMPROVED.

TYPICALLY, A FIRM WILL BECOME MOTIVATED TO IMPLEMENT LEAN PRODUCT DEVELOPMENT BECAUSE OF SOME COMPELLING PROBLEM OR ISSUE THAT HAS BECOME AN OBSTACLE TO SUCCESS.

SCENE 18.

KENNEDY:

If you go look at typical product development performance, it's dismal. The number of loopbacks, knowledge lost. Typical product development companies will pick a design very quickly and iterate on the design until they get it right against a spec. Any company that's spending a significant amount of rework, what we call loopbacks, are all candidates to go think the way Toyota does. Typically the traditional company will do what we call a design-test paradigm. You design a product, then you test it. Any company that does that is going to spend a lot of rework in loopbacks, a lot of ECO's on their project. Every company we look at has that problem.

SCENE 19.

MASCITELLI:

Unfortunately, it's rarely proactive. Ultimately I hope in the future people will see this as a mandate. But I think a lot of companies are faced with an insurmountable problem, or a significant problem. Competitors are beating them to market with products. Their costs are too high. They're not able to meet the expectations of contract

SCENE 20.

NARRATOR (VO)

GETTING STARTED IS ALWAYS THE GREATEST

CHALLENGE FOR ANY IMPROVEMENT INITIATIVE, AND

LEAN PRODUCT DEVELOPMENT IS NO EXCEPTION.

SCENE 21.

<u>KENNEDY:</u>

The very first step is to understand the difference and understand that they have to think differently about product development. They have to be thinking of learning first. If you go look at the basic principles at Toyota, you don't start with specifications, you end with specifications. Once a company learns the basics of how Toyota thinks, then getting started is much a mindset of getting the upper level management and leaders of the company to just start thinking in a different way and just start setting up much more of an early learning process before they move into development. This is one of the reasons it has been so tough for companies, because it's not simply taking this process and revising it and making it smoother or better, it's really about rethinking how you think about product development.

SCENE 22.

<u>MASCITELLI:</u>

The first step is to identify what your real problems are and really try to do some internal assessment of what your issues are. Often we tend to focus on trivial problems. Sometimes it's easy to just attack the trivial things. But we need to be very introspective and be honest with ourselves. So shine a harsh light on what we do everyday, and really ask yourself, is there a better way.

Probably the most important advice I would give in that arena is make absolutely sure that you're focusing on a problem that has enough impact when you solve it to make a difference to you. Solving a trivial problem successfully, the good news is you were successful, the bad news is you didn't accomplish anything. You need to prioritize your attack so you be sure you're attacking things that are going to give enough benefit to the company to really give some success and some balance sheet benefit.

SCENE 23.

NARRATOR (VO)

BUT WHAT ARE SOME OF THE MOST COMMON OBSTACLES

TO THE IMPLEMENTATION OF LEAN PRODUCT DESIGN

AND HOW CAN YOU OVERCOME THEM?

SCENE 24.

KENNEDY:

Bureaucratic management that are all set in current lean practices, current Six Sigma methodologies, phase gate systems. They've all got these systems in place that they think are going to help them, but in reality they're all based around the fundamental design and test mentality. The bureaucracies that set those up really don't want this change. I used to worry that engineers wouldn't want this change, but we're finding it's just the opposite. Engineers love this. Top management generally likes this because they can see tremendous bottom line dollars if they start implementing this. But you get into a lot of the mid management that have gone up through the administrative ranks and become very bureaucratic, and they say this is really tough to make this change. That's probably the biggest barriers.

The first thing they have to do is to re-look at what they think of as knowledge. One of the key lessons you learn from Toyota is their insistence on thinking of PDCA, which we call LAMDA—look, ask, model, discuss and act. It's getting the fundamental engineering structure back around learning and that part of the process early on. If you look at Toyota and what we recommend companies do is start thinking in terms of PDCA and LAMDA as a learning process. One of the pretty much famous tools of Toyota is what's called an A3, which is a simple one-page documentation. All the A3 is really a way of documenting the learning from the PDCA and LAMDA process. Once companies start building this expert workforce that understands how to make this knowledge visible, that knowledge will not only flow across projects, but it also becomes the basis for what we call set based concurrent engineering, which is looking at multiple alternatives early on.

SCENE 25.

RON MASCITELLI:

The first step I think is to be open about them. Communicate with the people involved, with team members, with management, mid-level and executive management and say look, these two things at least are going to be show-stoppers. If we're not ready to address these two issues, we're not going to be able to be successful. We need to be able to get everyone to understand that change is not just important, it's a mandate in our industry. And this is not change once, it's a culture of improvement over time. Get used to it, get on board, or you're not going to be able to participate as well in this company.

-- TOUCH TO BLACK --

SCENE 26.

NARRATOR (VO)

A LOSS OF COMPETITIVENESS IS A COMMON

MOTIVATION FOR FIRMS TO LOOK TOWARD

IMPROVEMENT INITIATIVES. HOWEVER, IT MAY BE

SURPRISING FOR YOU TO LEARN THAT MANY OF THE

FIRMS THAT HAVE EMBRACES LEAN PRODUCT

DEVELOPMENT ARE ALREADY HIGHLY SUCCESSFUL.

THESE FIRMS ARE SUCCESSFUL FOR A REASON; THEY

HAVE A PERFORMANCE DRIVEN CULTURE THAT DEMANDS

THE BEST FROM THEIR PEOPLE AND THEIR

PROCESSES. THIS IS CERTAINLY THE CASE WITH

TELEDYNE BENTHOS, LOCATED IN NORTH FALMOUTH

MASSACHUSETTS. THEY HAVE BEEN A LEADER IN

OCEANOGRAPHY INSTRUMENTS AND PACKAGING

INSPECTION EQUIPMENT FOR OVER 45 YEARS.

SCENE 27.

RON MASCITELLI
The compelling reason to pursue lean product design was the fact that we had elevated our margins from the mid-20s as Benthos, to the mid-40's, closing in at almost 50 percent profit margin, using lean techniques in our factory. Lean enterprise ideas like using 5S, continuous flow production, cellular production, kanban. We realized we weren't going to continue to increase our margins much over 50 percent given the nature of our business, and the only way to increase profit was to increase sales. We quickly decided that increasing sales meant better products for our customers. So we set a goal internally here at Benthos to double our productivity in new product development, to come up with products that better met customer interest, that would lead to higher sales. We pursued this activity since the middle of 2005.

SCENE 28.

NARRATOR (VO)

IN THEIR CONTINUING PURSUIT OF HIGHER

PRODUCTIVITY, BENTHOS TURNED TO MICHAEL

KENNEDY, PRESIDENT OF TARGETED CONVERGENCE.

SCENE 29.

RON MASCITELLI
To us, the most important part of improving our product development process here at Teledyne Benthos was understanding some new principles that we were first exposed to by Michael Kennedy and his company, Targeted Convergence. Those principles go back to a study that was done by the MCNS. They studied the Toyota product development system, and I emphasize product development system because Toyota is well know for their Toyota production system, which everyone tries to emulate and which works well. But I believe one of the secrets to Toyota's success is their product development system, which they don't talk about very often. The MCNS did study it, they were allowed in Toyota, and those principles became known to a number of people that now train in that field, one of which is Michael Kennedy.

SCENE 30.   **NARRATOR (VO)**

DESPITE A STRONG LEADERSHIP COMMITMENT TO

IMPROVING THE WAY NEW PRODUCT DEVELOPMENT WAS

DONE AT BENTHOS, THERE WAS SOME SIGNIFICANT

OBSTACLES TO OVERCOME.

SCENE 31.   **RICK SMITH**

One of our problems in this knowledge-based
product development is that the benefit
doesn't show up until you start accumulating
the knowledge. In the meantime, when you just
start out and you're starting to put this
knowledge down in knowledge briefs so that
it's accessible, that takes a lot of work.
And the guys are saying, "I have to design
this product and get it out the door, I don't
have time to sit and write a knowledge brief
about why this particular physics parameter
works this way." So it does take a while to
get them into that.

When they get through the first product design
cycle, and they have started to capture that
knowledge, that's when the light bulb goes on
and they say, whoa, now I can use this.
You've laid a lot of groundwork that you're
then going to use not only for the product
you're going to design today, but you're
laying the groundwork for the variations of
that product as you go further down into the
market.

SCENE 32.   **NARRATOR (VO)**

                                   ONE OF THE MOST EFFECTIVE WAYS OF IMPLEMENTING

                                   LEAN PRODUCT DEVELOPMENT IS TO SELECT A PILOT

                                   PROJECT TO DEMONSTRATE THE EFFECTIVENESS OF

                                   WASTE-ELIMINATING METHODS AND TOOLS. AT

                                   BENTHOS, THEY CHOSE A PRODUCT REFERRED TO AS

                                   THE T40000DSC. THE T4000DSC IS A PLASTIC

                                   BOTTLE INSPECTING MACHINE FROM THEIR TAPTONE

                                   LINE OF PRODUCTS.

SCENE 33.   **ROB CHEVALIER**
                                   That project evolved from some customer
                                   interest we collected on being able to take a
                                   piece of machinery we already had and make it
                                   faster, lighter, cheaper, better, and the
                                   machine was called a PBI, plastic bottle
                                   inspector.

SCENE 34.   **NARRATOR (VO)**

                                   ONE OF THE CORNERSTONES OF LEAN PRODUCT

                                   DEVELOPMENT IS THE TRANSITION FROM TRADITIONAL

                                   BUILD / FIX / RETRY / LOOPBACK DESIGN METHODS

                                   TO A KNOWLEDGE-BASED APPROACH, IN WHICH

                                   LEARNING AND TESTING OCCUR AT THE VERY FRONT

                                   END OF THE DEVELOPMENT PROCESS.

SCENE 35.

ROB CHEVALIER
We started with the customer interest first, understanding exactly the container that the customer wanted to inspect, which happened to be a standard 16-oz milk bottle. That was going to be our model container that we were going to design this system toward. Then we collected all the customer interest. We talked to customers. We met with marketing and sales. We found out what the customers wanted, what they didn't like about our machines, what they did like about the existing machines we had, and why they wanted something different. I had engineers travel to go ask these questions. That's how we got started, was understanding a few basic principles. We came out with a few ideas and we came up with a couple parameters that we designed toward. One was that we had to have 220 feet per minute was the maximum speed the machine had to travel, and we had to design to a 6 thousandths, .006 inch leak size in the container.

That was basically the two parameters that we designed toward. They didn't tell us it had to be 48 inches long, they just said it had to find this size leak at this speed, and it had to cost half of what the other piece of equipment cost to build. Our internal cost for building the equipment, we had to reduce it by half. Those were the three parameters that started us. Everything else was open.

SCENE 36.

NARRATOR (VO)

THIS NEW DESIGN PHILOSOPHY IMMEDIATELY

TRANSLATED INTO PRACTICAL DESIGN SOLUTIONS

THAT WORKED THE FIRST TIME THROUGH THE

DEVELOPMENT PROCESS.

SCENE 37.

ROB CHEVALIER
First of all we had to be able to prove we could do a 6 thousandths leak at 220 feet per minute. So we built a prototype machine, a proof of concept machine we call it, to be able to quickly, within a couple of weeks, make some experiments and try running containers, and try different schemes of moving rollers. We basically squeezed the containers and we have a couple load cells at the entry and exit to measure the variation in pressure. So we quickly built a test fixture with stuff we had already in the building.

SCENE 38.

NARRATOR (VO)

ALONG WITH TOYOTA-BASED KNOWLEDGE MANAGEMENT

TECHNIQUES, LEAN PRODUCT DEVELOPMENT EMPLOYS A

POWERFUL INNOVATION METHODOLOGY PIONEERED BY

TOYOTA KNOWN AS "SET-BASED" DESIGN. THE

CONCEPT IS VERY SIMPLE: RATHER THAN

IMMEDIATELY CONVERGING TO A SINGLE DESIGN

CONCEPT, DESIGNERS ARE ENCOURAGED TO CONSIDER

SEVERAL DESIGN ALTERNATIVES THAT ARE DIVERSE

IN THEIR APPROACH TO SATISFYING THE TARGET

CUSTOMER. THIS "SET" IS THEN EVALUATED AND

THE BEST ATTRIBUTES ARE MERGED INTO AN

OPTIMIZED CONCEPTUAL DESIGN.

SCENE 39.

RICK SMITH

In particular, TapTone, when they did the T4000, they had a brand new board set they wanted to design. The old digital signal processing board they had, an old dog, parts going obsolete shortly, doesn't have as many features, but it works. That works, and that could work in this product. It wouldn't give you all the features, but that's a possible set choice. Now this new board they've got, it's coming along, it's looking good, but there's risk. Any time you design a board, new software, there's risk that it's not going to work. But they've got these two board sets going down all the way down to the end. I think they went through a 6-month design cycle. They have a show coming up in Chicago, they have to have a machine there, it's got to work, and they know if they have to, they can take the old board, plug it in on the day they're read to ship, and they're done, it works. It might not have all the features, but it works.

As it turned out, the week before they were supposed to ship the machine, the new board was fired up, and it worked, and the software ran, so that's what they put in the unit they shipped to Chicago. But they were confident that they weren't going to get stuck with "oh my God, we got to the end, it didn't work, we have to do a design loopback." So that's one of the features of the Toyota method of designing products that's very important, this concept of set based design.

SCENE 40.

RON MARSIGLIO

I would recommend anybody that doesn't use a knowledge-based product development system to get the training, understand the principles, and to not try to copy what we're doing or what Toyota does, but to understand the principles and apply them to your culture and the behavior of your engineers and sales and marketing people. All the changes you make developing a knowledge-based product development system are additive. If you have knowledge briefs, that's better. If you understand customer interest, that's better. But the only way to fully implement the process is for the general manager or the president or CEO to understand and support it.

-- TOUCH TO BLACK --

SCENE 41.

NARRATOR (VO)

CARLETON LIFE SUPPORT SYSTEMS; LOCATED IN

DAVENPORT IOWA, IS A LEADER IN THE DEVELOPMENT

OF HIGH-PURITY OXYGEN SYSTEMS AND CRYOGENIC

COOLERS FOR THE AEROSPACE AND DEFENSE SECTOR.

SCENE 42.

RALPH WILCOX
Our customers are primarily either directly to the military, or the prime aerospace manufacturers, people like Lockheed, Boeing, Grumman, Airbus, those corporations. Our business is primarily contracted.

We have different levels of technologies we use in our products. We have some product lines which date back to WW II and the same basic technology has been used for the last 50-60 years. Other technologies we have, we have been developing on our own. Oxygen generating systems and cryogenic coolers, the technology is understood, but we're a modified off the shelf type development. And we do our own technology development in cutting edge areas of generating oxygen or solving those types of issues for customers.

SCENE 43.

NARRATOR (VO)

AS A PROJECT-FOCUSED FIRM, CARLETON'S

MOTIVATIONS FOR IMPLEMENTING LEAN PRODUCT

DEVELOPMENT WERE DRIVEN BY THE NEED TO MEET

CONTRACT DELIVERY SCHEDULES. IN THE DEFENSE

AND AEROSPACE SECTOR, THE ABILITY TO

ACCELERATE PROJECT SCHEDULES TO MEET

AGGRESSIVE DEMANDS BY CUSTOMERS IS CRITICAL TO

LONG-TERM COMPETITIVENESS. ALTHOUGH CARLETON

HAD BEEN SUCCESSFUL IN THIS REGARD IN THE

PAST, THEY HAD BECOME CONCERNED THAT THE

COMPETITION COULD OVERTAKE THEM IF THEY DID

NOT IMPROVE THEIR SPEED AND RESPONSIVENESS.

SCENE 44.

RALPH WILCOX
We got interested in lean product development
about two and a half years ago, as a follow-on
to our lean manufacturing emphasis. We
realized, as a company, that unless we change
and improve processes, change and improve the
way we do our engineering, that other
competitors are going to catch up and pass us
by. That was a compelling reason to do that.
We had processes, a lot of the ways we were
doing things, that had been carried on for 30,
40, 50 years without even being looked at. So
that was one reason. A second reason we
wanted to do that is we had a number of
product development projects which were
running behind schedule, running over budget,
weren't meeting their technology goals.
Somehow we needed to be able to get those
under control and have a better, smoother,
easier way of developing products.

SCENE 45.   **NARRATOR (VO)**

THE TOOLS AND METHODS OF LEAN PRODUCT

DEVELOPMENT SPAN THE ENTIRE RANGE, FROM

STRATEGIC MANAGEMENT OF A FIRM'S KNOWLEDGE, TO

TEAM-BASED TOOLS FOR RAPID EXECUTION. SOME OF

THE KEY TOOLS FOR LEAN DEVELOPMENT TEAMS

INCLUDE: STAND-UP MEETINGS THAT ENABLE RAPID

AND EFFECTIVE COMMUNICATION AND PRIORITIZATION

OF TASKS, VISUAL PROJECT BOARDS THAT HIGHLIGHT

CRITICAL AREAS OF FOCUS AND HELP RESOLVE

ISSUES AND PROBLEMS, CRITICAL-CORE SCHEDULE

TECHNIQUES TO KEEP THE TEAM FOCUSED, TIME-

SLICING TECHNIQUES TO IMPROVE EFFICIENCY AND

AVOID RESOURCE BOTTLENECKS, AND FINALLY, MUST

/ SHOULD / COULD PRIORITIZATION OF BOTH THE

FEATURES AND ATTRIBUTES OF A NEW PRODUCT. AND

FINALLY, THE DAILY WORK ACTIVITIES OF

DEVELOPMENT TEAM MEMBERS.

SCENE 46.

<u>CHARLES YEAGER</u>

We have adopted several of the lean product development tools. First and foremost we adopted like a tiger-team or swat team approach to small projects within a particular type of technology. Our linear cooler group has been using that technique now for several years, and has been very successful in product launches. They have been able to take iterations of specific designs and roll them into new product launches and get them to the customer in a very short period of time by using daily meetings, by using a collaborative team approach within both the design, the engineering, the testing, and manufacturing. Beyond the cooler group, we have pushed the lean product development into all the engineering design groups. There is the oxygen systems, nitrogen systems, the regulators. We've been using it in our ceramic oxygen groups where we've been using visual boards for statusing of projects, which helps the team understand if for any reason they couldn't make a meeting. They can look at the boards, management can look at the boards. We've been using shorter meetings, more frequent meetings, to insure the status of projects, make sure the task lists get to the appropriate people, and people are getting the job done.

SCENE 47.

<u>NARRATOR (VO)</u>

ONE PARTICULAR PROJECT AT CARLETON REALLY PUT

TEAM-BASED LEAN PRODUCT DEVELOPMENT TOOLS TO

THE TEST.

SCENE 48.

RALPH WILCOX:

One of our pilot projects was a high-risk, high speed project. There were some financial penalties if we didn't perform within the schedule as dictated. It has been running very smoothly. We used many of the techniques, the stand-up meeting techniques we were taught by Ron Mascitelli; the quick feedback, quick turnaround times, the improved flow of communication, knowledge and information has really helped that project. It was a high visibility project that we have run in a different manner, rather than the heavy handed oversight manner. We have let the team direct itself with the guidance of a program manager, and it has been working quite effectively.

We have had trouble in the past in dealing with projects less than eight months. Recently we adopted a very high profile, very future growth project, and we nicknamed it hot steel, to protect all the investors. The project was a 6-month project. By adopting several of the methods I spoke of, it has been a very big success. We had daily meetings, 15 minutes in length. We involved the focus team, the IPT collaborative team, engineering, manufacturing, reliability, program management, the business development customer, the buyers, all the stakeholders were involved in these daily meetings. We used visual project board to identify all the tasks that needed to be done, all the issues the stakeholders had, and we used the yellow/green/red chart to identify the progress against the key technology parameters, the customer parameters. That enabled us to do early prototype testing, getting hardware in on time. It enabled us to do early testing, followed by somewhat of a low risk design and development testing. Now we're in the final stages of delivering the validation verification hardware to the customer.

What's so nice about the 15 minute standup meeting, many times we actually do stand up. That gives people the sense that it's not going to take very long, I can get the information I need, and I can get out of here. Or, if this particular meeting doesn't direct me, it's only 15 minutes. The rolling of the eyes, the use of the Blackberry, the scribbling of stars and what not on the paper, typically are people who have been there for an hour saying why am I here. The project leader, either the program management or IPT leader, can easily see that, and then we can talk and say hey, instead of coming Monday, Wednesday and Friday, just come on Friday, you

SCENE 49.

NARRATOR (VO)

IT IS EVIDENT THAT ALTHOUGH CARLETON IS JUST

BEGINNING ITS JOURNEY TOWARD LEAN PRODUCT

DEVELOPMENT IMPLEMENTATION, THEY ARE ALREADY

SEEING SUBSTANTIAL BENEFITS.

SCENE 50.

RALPH WILCOX:

We have been happy with what we've been doing so far. We've learned a lot. The proof in the pudding of course is actually implementing it and getting results. Changing processes and changing how people work is difficult, it takes a long time. Then to develop products at the same time you're changing your processes, and trying different ways of working and developing products, it's just a longer and slower process. The cycle time can be a short one, 6 months, or a long one, 36 or 48 months, so you don't get the quick, direct feedback you would get from the manufacturing floor. That can get frustrating. You to have to keep a long term vision in mind and not get too excited when things start to diverge. You can bring them back in. The other difficulty is once your eyes start getting opened to how you can do things better, you bite off more than you can chew, so to speak. It becomes very difficult when you've got so many different processes and so many different things you're working on, to see progress in all of those. It's better in a sense to focus on a few things, get some pilot projects going, and work on them.

SCENE 51.

<u>CHARLES YEAGER:</u>
Do it. The Nike commercial, just do it. I think the habits of the past, things that have become comfortable for a product team to do, needs to be shook up. I'm one of them. I've been doing this for 20 years, and I really see the advantages of my time, the people that I'm supervising, the people that are in my teams, I can see the value. And many times people come back and say hey, this is working good, let's keep doing it. And when you get that kind of feedback, and we're talking everyone from someone who has been two years in the plant to people that have been 30 years in the plant. People are recognizing how effective this, and it frees up their time. People who want to work, and that's hopefully who you hire, are here to do work, not sit in meetings, not waste their time. They want information they can use, in a timely manner, so they can do their job, and get that information to their customer. The advice would be, try to implement it. Don't take too big a step, because if it's not successful, then it's just another one of those acronyms, another one of those things we tried for a year, and it didn't work, and it falls into the basket of things tried and not successful. I really feel this is not just another one of those.

-- TOUCH TO BLACK --

SCENE 52.

1) REDUCED TECHNICAL AND SCHEDULE RISK

2) BUILDING A KNOWLEDGE BASE FOR FUTURE PROJECTS

3) ACCELERATED TIME-TO-MARKET

4) IMPROVED RESOURCE UTILIZATION

5) ENHANCED PRODUCT VALUE AND QUALITY

NARRATOR (VO)

WE HAVE SEEN THAT LEAN PRODUCT DEVELOPMENT WORKS WITH REAL FIRMS UNDER REALISTIC PRODUCT DEVELOPMENT CONDITIONS. THE SUBSTANTIAL BENEFITS FOR THESE FIRMS INCLUDED:

REDUCED TECHNICAL AND SCHEDULE RISK FOR PRODUCT DEVELOPMENT PROJECTS THROUGH A KNOWLEDGE-BASED APPROACH TO PRODUCT DEFINITION AND DESIGN

BUILDING AN EVER-GROWING KNOWLEDGE BASE TO AID FUTURE DEVELOPMENT PROJECTS

FASTER TIME-TO-MARKET,

IMPROVED PRODUCTIVITY OF SCARCE DEVELOPMENT RESOURCES THROUGH BETTER PRIORITIZATION AND WORK EFFICIENCY, AND

FINALLY, ENHANCED PRODUCT VALUE AND QUALITY RESULTING FROM BOTH A KNOWLEDGE-BASED APPROACH TO DESIGN AND BETTER TEAM COMMUNICATION AND COLLABORATION THROUGHOUT THE DEVELOPMENT CYCLE.

SCENE 53.

MICHAEL KENNEDY:

 Once any company starts getting to that level, they're going to start dominating their industry, and the other ones will start looking at it. Until companies start seeing that their competitors have changed, then they're all competing on a level ground. What Toyota has done is turn the automotive thinking upside down, because they dominate so strongly. If you look at their market capitalization, it's higher than the next five auto companies combined. It's hugely successful. And I think that's what's going to drive the real change. It's both people understanding, and in our view, you get one or two companies in every industry to start doing this, and then it will start catching on and it will start migrating that way.

SCENE 54.

RON MASCITELLI:

I think in the future lean product development has a huge central impact on competitiveness. It is the core value creation in any manufacturing firm, not to mention service firms, software firms. Product development is where value is created in our society. As we look at manufacturing jobs being outsourced out overseas, and commodity competition being somewhat out of our reach, the place that we can add value as a nation really, in North America and Canada as well, is in creating new and innovative products that excite the world. If we can be better and faster at that essence, we can continue to manufacture, we can continue to grow economically. Frankly, without it, with a wasteful, slow, outdated approach to product development, I think we have a significant competitive disadvantage globally. The good news is, lean product development is a sustainable approach to competitiveness. If you continue to get more efficient and better at what you do, and eliminate waste faster and better than your competition, you can sustain a lead that is indefinite. You always have an advantage.

SCENE 55.

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