

Leveraging Agile Practices at Home

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The product realization process is a major strategic focus today in almost all industries. From creation of new product and process designs through production change-over and final shake-out, everybody wants shorter cycles, less scrap and rework, and minimal impact on existing production activity. The object of course is to introduce a new product or new model seamlessly into a functioning production environment and never miss a lick: No overtime, no lost units, no scrap, and full production rate the whole time. Change proficiency at its best.

How do we achieve this? Where do we start? Though a considerable research effort is underway to develop design principles and operating procedures for the magic factory, few companies have appetites for a capital-intensive, new-paradigm, greenfield approach these days. At the same time, beleaguered production management is so busy making rate that reengineering a functioning environment for Agility sounds risky, faddish, and foreign.

“An Agility audit will discover both mature and fledgling Agile practices within an organization.”

Picture this: The King watches from his castle tower as his knights battle below. On bended knee before him is a machine gun salesman with a fully loaded, 50-caliber, air-cooled tri-pod model. “Not now”, says the King, “Can’t you see there’s a battle going on?”. Short sighted, but his battle will end, and then he’ll have the time for calm consideration. In too many production environments and downsized engineering

departments the battle never ends; and machine guns don’t look at all like the familiar sword.

The machine gun salesman might get off to a better start by praising the values of the catapult -- noting that it sent projectiles a great distance and avoided hand-to-hand casualties -- and suggesting that this familiar concept could be applied to personnel as well as castle-walls. By the same token, creating interest in Agile practices can be facilitated by pointing to some that already exist.

With change on the increase any sizable company today is bound to have some reasonable examples of Agile practices somewhere. Though these mature examples may be hard to find, undeveloped Agile practices are generally present in much larger numbers. Like the catapult, they can provide a comfortable and familiar starting point if their Agility values and characteristics are identified and promoted.

A descriptive technique for Agile practices was tested by the Agility Forum recently on eighty cases of various business elements, ranging from equipment and control architectures through organizational and operating procedures. This initial “Agile Practice Reference Base” uses a standardized 2-page format of explanatory text and tabled summaries (and can be obtained from the Forum by calling 1-800-9BE-AGILE). Tables identify the key change issues and compare change proficiency metrics and system characteristics of the Agile practice with a more common practice.

Our objective here is to show how Agile practices in your company can be identified, evaluated, and communicated by applying change proficiency metrics (this column, Jan. ‘95), change types (Feb. ‘95), and Reusable-Reconfigurable-Scalable strategies (Mar. ‘95). This descriptive procedure can be a powerful tool in the Agility audit process (May ‘95) for leveraging valuable organizational knowledge.

To illustrate the procedure we will use a specific case of an Agile practice to help in our discussion. The accompanying side-bar example describes a modular checking fixture known as the “Pittsburgh Universal Holding Device” in a GM metal stamping application. It is chosen because it is patented public information, and because it illustrates an Agile practice developed serendipitously under stressful circumstances.

These check fixtures are used to verify tools, dies and processes involved in the production and fabrication of automotive body parts. As the side-bar suggests, this innovative approach was motivated by a shortage of storage space at the Pittsburgh plant -- but the solution yields Agile benefits leveragable across the corporation.

Referring to the top of the side-bar we see a comparison of change-proficiency metrics. This comparison highlights the dramatic difference in cost and time to develop a new fixture, promising cost reductions across the corporation as well as shortened develop cycles and new innovative uses.

Scope is the metric that gauges breadth of potential applicability. Some of the innovations possible with this approach might include: Temporary fixturing, set tooling, match checking, and high frequency part verification. Opportunities are enabled for partial production checks, checking at production as well as assembly points, and duplicate fixtures at different locations.

Referring to the bottom of the side-bar we see a capsulation of the key change issues associated with the life cycle of a checking fixture. Importantly, the top of this table defines the specific system we are focused on in terms of its framework and modules. Experience has shown that this defining process is necessary to keep the change issues focused on the system in question and not on its environment.

For instance, this particular table does creep outside the fixture architecture system and into its environment when it offers relocation of fixture and storage as reconfiguration issues, and when it offers multiple use points as a capability issue. These two are actually issues in a system where portable tools

are the modules and plants, processes, and facilities are the frameworks. The issues are valid and well dispatched with this fixturing approach, and correctly belong in a second column of the table devoted to these higher level issues. We have taken liberty in

these constrained spaces.

This example also illustrates an important feature of truly Agile practices: They can be introduced to the existing environment without disruption, and easily migrate to stronger and more pervasive forms over time. The Pittsburgh example is meritorious in that it requires no special expertise or new technology, nor does it require an investment and payoff period of any significance. When capital investment and sophistication are permitted, the concept can be extended with new technological solutions that automate the fixturing set-up and employ laser CMMs. Even then, the Pittsburgh approach with manual fixturing set-up might continue to have value where physical portability to points of use is important, e.g., in prototype and pilot part production perhaps.

Plants that are stressed are ideal settings for Agile practices. The unique specialization on high variety, short run processing at the Pittsburgh plant has spawned other innovative solutions such as quick-die-change processes and universal shipping containers, welding cells, and adhesive applicators.

An Agility audit (May '95) is a productive way to discover both mature and fledgling Agile practices within an organization. Agile practice descriptions then provide a corporate diffusion mechanism and business case foundation for more of the same, heighten the general appreciation for RRS values and characteristics, standardize a digestible communication format, and illuminate the bottom line values of Agility. Of course exposing an Agile practice description across a corporation also celebrates and encourages meritorious contributions.

Good places to find Agile practices are in stressed plants -- those with space constraints, variety and lot-size extremes, short lead-times, quick response requirements, etc. Another good hunting ground is in those plants that accomplish major change activities better than others - the ones that meet capacity fluctuation demands and carry out new model introduction, new product start-ups, and facility reconfigurations predictably.

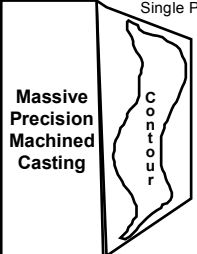
Agility has always been a requirement of successful business - but in slower times it was easy to adapt to the changing business environment. Though being proficient at change these days is getting tougher, the pervasiveness of change has forged some novel practices in most companies. Finding and illuminating these gems can be a powerful kick-start to any internal Agility program.

Agile Practice

Modular Body-Panel Check Fixtures

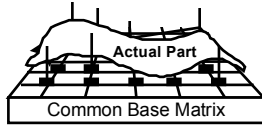
<p>Hard Fixtures Create: \$70,000 Create: 37 Weeks Use: 4 Parts/Hr Create: 20% Rework Use: 100% Accurate 60% Predictable Restricted Use Single Purpose</p>	<p>Benefits Cost \$3,000 Time 1 Week Time 40 Parts/Hr, 3.5 Min. Set-Up Rework, Easy Modification Robustness 100% R&R Accuracy Scope 100% Predictable Scope Innovative Uses Scope Opportunistic</p>	<p>Pittsburgh Universal Holding Device Cost \$3,000 Time 1 Week Time 40 Parts/Hr, 3.5 Min. Set-Up Rework, Easy Modification Robustness 100% R&R Accuracy Scope 100% Predictable Scope Innovative Uses Scope Opportunistic</p>
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Massive Precision Machined Casting



Features

No	Reusable	Base, Retainers
No	Reconfigurable	Retainers, Details
No	Scalable	Details/Part, Parts/Facility



Patented by General Motors, contact Joe Pelan, 412-469-6571, GM Pittsburgh Metal Center.

The General Motors Pittsburgh stamping plant specializes in small-run, high-variety, service parts such as hoods, quarter panels, doors, and other stamped and welded metal fabrications. Small quantity orders stress traditional operating modes for profitability, while high variety stresses tool and die management and manual operations.

Body panel check fixtures presented a particular problem to this plant: 700 plus fixtures, with more coming, required a prohibitive amount of storage space. The financial climate did not permit a capital intensive high-technology solution but relief had to be found.

The plant invented a modular fixture scheme that utilized a common grid-work base plate with part-specific holding "details" that snapped into "retainers". Details could be machined in-house quickly and inexpensively, and then stored in a shelved shoe-box sized tray.

Unplanned, this space problem solution offers a variety of valuable Agile benefits for GM's traditional stamping and assembly plants.

(Explanation details would continue with a complete description.)

RRS System (Reusable, Reconfigurable, Scalable):	
Framework:	Common base plate with retainer grid.
Modules:	Retainers, Details.
Key Change Issues:	
Creation:	Make new checking fixture. Make duplicate checking fixture.
Augmentation (Improvement):	Reliability and repeatability.
Migration:	To laser CMM. To automated creation and set-up.
Addition/ Subtraction:	Both CMM and manual measurement alternatives. Check at point-of-production and point-of-assembly.
Correction:	Broken/bad/lost check fixture.
Variation:	Set-up for different part.
Expansion/ Contraction:	Parts checked per hour.
Reconfiguration:	Construct different fixture from common parts. Change facility storage location. Change plants.

Partial Example of Agile Practice Description Format.