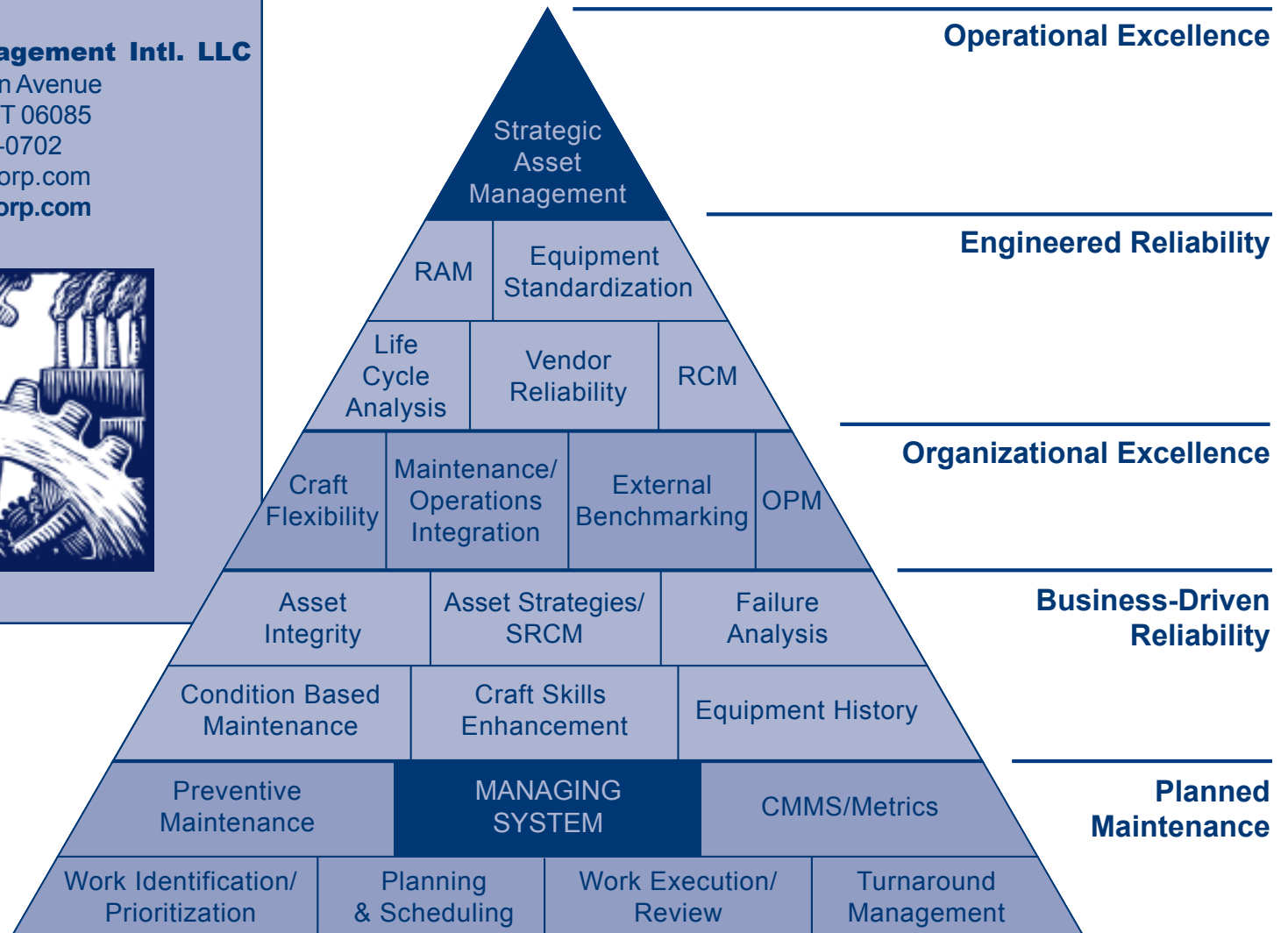


The SAM Asset Healthcare Triangle

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SAMI's Asset Healthcare Maturity Matrix

Class Stage	Low Performing	Competent	High Performing
Planned Maintenance	<ul style="list-style-type: none"> • “Fires” determine priorities • Breakdowns frequent • Maintenance equates to repair • Ineffective work orders, plans, controls • Stores service levels low • Poor operator/maintenance relationships • Unable to meet production budgets 	<ul style="list-style-type: none"> • Most work planned, scheduled • PM implemented, defects id'ed & corrected • Trades competent at most repairs • Computerized work system implemented • Stores service levels support operation • Operators prep for repairs • Maintenance goals & KPI's in place, reported 	<ul style="list-style-type: none"> • All work prioritized, scheduled w/ prod'n • PM hours and W.O.s exceed repairs • CMMS fully utilized • Parts kitted for jobs, 2x annual turns • Operators inspect, create WO's • Long-range scheduling implemented • Turnarounds well planned, executed
Business-Driven Reliability	<ul style="list-style-type: none"> • Equipment history unusable • Failure analysis infrequent, ineffective • PM's don't match equipment or need • Inspections don't get done • Equipment criticality based on emotion • Condition monitoring sporadic, ignored • No comprehensive asset care program 	<ul style="list-style-type: none"> • Equipment history is accurate and used • Critical assets have clear prevention plans • High percentage of PM compliance • Inspections yield WR's, scheduled & done • Condition monitoring widely used, trusted • Trades competent at most repairs • Failure analysis system established, effective 	<ul style="list-style-type: none"> • Asset healthcare program for all equipment • Predictive techniques minimize downtime • Failure analysis done for 80% of failures • Results of RCFA's implemented routinely • Condition monitoring based on cost & risk • Prevention is a cultural imperative • Trades work on designing out failure
Organizational Excellence	<ul style="list-style-type: none"> • Training unconnected to real work practice • “Team” implementation causes confusion • Supervisors lack authority, accountability • Unclear roles and responsibilities • Skills flexibility in contract, not implemented • Operators don't inspect or maintain equipm't • No individual performance targets/goals 	<ul style="list-style-type: none"> • Supervisors have clear roles & accountability • Operators inspect, lube, prep equipment • Task teams form, identify solutions, disband • Most work is directly by a priority system • Natural work teams effective at routine maint. • Service contract exists between maint & ops • Craft multi-skilling and flexibility implemented 	<ul style="list-style-type: none"> • Work teams flexible, self-directed • Supervisors coach & advise • Continuous improvem't embraced, effective • Clear priorities established for work • Reward/Recognition support best practices • Skills predominate over functions • All staff systems competent
Engineered Reliability	<ul style="list-style-type: none"> • RCM implementation creates confusion, results not implemented • Jobs changed on paper, not in reality • Stages 1&2 are ignored to “eliminate work” • Emphasis on analysis, not implementation • Vendor reduction brings lower service levels 	<ul style="list-style-type: none"> • Reliability models run for critical systems • Component MTBF specifications defined • Equipment standards implemented • Critical equipment assessed via RCM • Projects get input from maintenance, ops • Equipment types, models rationalized • Purchasing buys by lifecycle cost, not price 	<ul style="list-style-type: none"> • Concurrent engineering assures RAMBO • Reliability tied to financial results • Lifecycle costs are the basis for decisions • Vendor contracts pay for function reliability • Production targets set by reliability models • Equipment failures are a rare occurrence
Operational Excellence	<ul style="list-style-type: none"> • Management unclear re: goals & methods • Equipment condition not factored into goals • Equipment run parameters changed daily to respond to market pressures • Too many priorities prevent focus • Poor understanding of plant potential/liabilities 	<ul style="list-style-type: none"> • Clear organizational alignment • Goals cascaded from plant level to individual • Production goals based on plant capability • Most work identified and planned prior year • Hourly help set unit goals & work improvements • Activity-Based Management implemented • Prod'n reliability is part of product marketing 	<ul style="list-style-type: none"> • Each employee knows & is rewarded for role • All decisions based on facts and models • 80% of work is preventive or project, & is identified prior to the start of the year • Production is 98% predictable • Lowest cost producer • Plant becomes corporate expansion site

RAMBO=Reliability, availability, maintainability, buildability, operability WR=Work request RCFA=Root Cause Failure Analysis KPI=Key Performance Indicator OUE=Overall Unit Effectiveness (OEE)