A.ENGINEERS

Examples of six sigma projects:

1. **six sigma project: rail car <u>cycle time</u>.**

    Define: Eliminate paying extra demurrage charges on rail cars.
    Measure: Paying over four days demurrage on some rail cars. Any demurrage charge over the allowed is a defect.
    Analyze: Rail car traffic, switch engine schedule, rail company operating rules, operating company procedures, spotting procedures.
    Improve: Changed sequences of handling empty and full cars. Modified loading times by less than 2 hrs. Result is essentially no demurrage, over the allowed, for the entire site.
    Control: Rail company changed procedures and operating company changed scheduling practices.

2. Six sigma project: chemical plant bottleneck.

Define: Distillation tower has internal damage limiting production rates. Next outage is scheduled in one year. If outage taken now to repair damage we will still have to take outage in one year because of parts delivery for other essential projects.

Measure: At anything over 85% of capacity the distillation tower will not perform. With six months of effort, Operations Engineers and Process Engineering could find no solution other than to take an early outage. Anything less than 100% capacity is considered a defect.
Analyze: Identified key operating variables, established allowable ranges for each, and conducted a **Designed Experiment**.

Improve: A single set of conditions allowed operations at 102% of capacity without problems. At that level another part of the plant became the bottleneck. Increased capacity until scheduled outage worth $6million.
Control: All shift operators were trained for new conditions and the operations procedures were modified.

3. Six sigma project: retail display.

Define: Marketing has designed a "fancy" display unit that they think will outperform the "standard" display unit and they want to put one in every store. "Fancy" display is 10X cost of a "standard" display and all stores already have "standard" units. Should the new displays be purchased.
Measures: Have data for each store on sales of this product for every day.

Analyze: The stores identified at least three other factors besides display type that could impact sales. Range for each factor was identified. **Design of Experiments** was conducted.

Improve: "Fancy" display had no significant impact on sales. The "fancy" displays were not ordered for any more stores, with considerable cost savings.
Control: Future changes will be tested and evaluated using statistical techniques.

4. Six sigma project: water treating.

Define: Water treating unit in 15 years had never been able to handle the nameplate capacity. Treatment chemical costs were higher than other types of treatment units.

Measure: Confirmed flow rate through the system vs. nameplate.

Analyze: Measure system evaluation and found many measurements that were off by over 100%. Hourly operations identified key variables in the operation of the unit and the acceptable range of each. Conducted three different Designed Experiments.

Improve: Corrected the measurement problems. Found set of operating variables that produced 107% of nameplate capacity at higher quality with lower chemical use. Chemical use reduced by $180K per year.

Control: Hourly operations trained, procedures modified, process to check measurement instituted. Model for changes in inlet water conditions.

5. Six sigma project: power distribution reliability.

Define: Large chemical site had significant losses due to power outages.

Measure: Dollar value determined for each failure and the total. Each failure was assigned to a major component.

Analyze: Mapped the entire system by major component and identified failure rates for each major component. Found areas with projects scheduled that were very unlikely to fail and would add nothing to overall reliability. Other components were being ignored and had a highly likelihood of causing an outage.

Improve: Developed plan for each component depending upon **failure mode** and frequency for that component. Made a 10X reduction in the dollar losses due to power failures on site.

Control: Track each major component and modify action plan based on failure mode if needed. System shared with other locations.

6. Six sigma project: redundant analysis.

Define: Analysis is being conducted at two and three locations for the same product with different results from each location. Capital requests from multiple area for the same analysis for the same material.

Measure: For each analysis collected the corresponding results from each location. Totaled the capital request for analysis where they were already being done or duplicate requests for the same analysis.

Analyze: In some cases the methods were the same and the brand of instrument the same, some had the same type of instrument but different brand and different procedures, in others different types of instruments were being used. Found over calibration of most instruments. Sources of variation for each type of analysis were investigated using **Design of Experiments**.

Improve: Real time telemetry of data eliminated some redundancy. For other analysis correlation curves had to be developed to show the equivalent values for different methods and agreement was reached to use one analysis and share the results. Totally eliminated the significant capital request for analysis.

Control: Modified capital authorization request procedure. **Control charts** for each analysis to determine when to calibrate.

7. Six sigma project: new capacity justified.

Define: Contract to deliver product at a minimum rate on a daily basis. Severe penalties if rate missed by even a small amount. Customer "good will" also an issue.
Measure: Capacity of units in the system more than the minimum rates. Collected failure rate data for each unit and time to repair.

Analyze: Failure rate data combined with the time to repair data indicated that there were significant periods of time when the minimum contract rates could not be met and penalties would be paid.

Improve: Capital approved for an additional unit. Within the first year the new unit was required at least four separate times for several weeks each time to meet the contract minimums. Any one of the four times returned enough cash to pay for all of the capital expended.
Control: System to track and monitor failure data and repair time data.

8. Six sigma project: people selection.

Define: Why is there such a difference in the sales performance of people?

Measure: Top people have 10X volume of the bottom 25%. Failure to meet sales quotas is a defect.
Analyze: Education, training, time in job, product line, sales area, profiles.

Improve: Able to identify by profile 72% of the top sales people. Use this tool to select new people into this function.

Control: Use profiles for new hires and continue to **monitor** performance levels.

9. Six sigma project: parts failing after final machines.

Define: Inspection is rejecting a high number of parts after final machines.

Measure: Product yield was determined and number of defects in total to establish defect yield and sigma value. Analyze: Machine operators, engineers and vendor identified variables that could impact the production of defects. Range of acceptable levels determined for each variable. Five different **Designed Experiments** were conducted.

Improve: Operating instructions changed to the conditions with the lowest defect production consistent with capacity limits. Final product yield increased 13%.

Control: **Control charts** installed for each machine. **Decision tree** corrective action plan provided for known defects and known corrective actions.

10. Six sigma project: out of specification product.

Define: Amount of product out of specification (spec) and being automatically removed is high. No recycle or salvage value.

Measure: Quantified the amount of out of spec product for each product grade.

Analyze: Operations and Engineers identified the variables that impact the production of out of spec material. Several of these are preventive actions performed by operations. Ranges for the levels and frequencies for the variables were determined. **Designed Experiments** were run and acceptable levels and frequencies determined.
Improve: Levels for the variables and frequencies for operator preventive actions established. Out of spec material dropped by 50%.

Control: Operating procedures were modified, schedules for operator corrective actions instituted, and **control charts** for the amount of out spec material are being kept.

11. Six sigma project: engineering changes.

Define: Large number of changes from client after approving engineering design. Schedule slipping.
Measure: Number of changes, time involved in changes, compliance to critical path schedule.

Analyze: No clear authority on client team to establish scope, any of client team could make changes, verbal communication of changes, conflicting changes by client team members. Language issues between client and engineers.

Improve: Regular engineering/client meetings where topics included: scope for each section and desired objective, known limitations defined, unclear requirements were questioned and options discussed. Written plan signed by client representative and engineering lead. Change requests in writing and signed by client representative. Changes decrease by factor of 4.7 and schedule met.

Control: Change requests all in writing. Shared approach with other disciplines on project.

12. Six sigma project: web design.

Define: Design a web site that ranks in the top ten (10) on all major search engines and directories.
Measure: Enter "six sigma" and check ranking in search engines.

Analyze: URL name, title of pages, and other factors are major ranking criteria. Reciprocal links and other routine activities aid in search engine ranking.

Improve: Purchase URL with six sigma included, optimize each page, develop reciprocal links, and perform other regular activities required to maintain traffic and ranking.

Control: Monitor ranking on search engines weekly. You can check on the success of this project by entering "six sigma" in the search field of your favorite search engine. The titles and descriptions may vary , the URL link is the performance measure.

B. BBA,MBA HR….
Examples of six sigma projects:

- Reduce the time required to hire an employee
- Improve employee on-boarding and orientation processes
- Reduce expenditures for Recruitment
- Improve timeliness and the value of employee performance reviews
- Reduce absenteeism
- Improve training efficiency
- Improve employee satisfaction
- Identify and correct retention issues
- Reduce Incentive Compensation errors
- Eliminate Overpayments to Terminated Salaried Employees
- Improving grievance handling process.
- Consolidation of employee information databases
- Integration of multiple payroll systems for remote locations
- Increase job posting hit rate
- Design of job posting templates for recruiters
- Increase retention using exit interview information

BBA,MBA HR….
Examples of six sigma projects:

- OT authorization compliance
- Faster performance review for merit recommendations
- Benchmarking profit sharing with competitors
- Automatic paycheck deposit
- Eligibility for employee stock option plan (ESOP)
- Process mapping and risk management of acquisition integration process
- Consolidation of employee information databases
- Integration of multiple payroll systems for remote locations
- DFSS process design for discipline/termination/dismissal
- Job design and negotiation for outplacement
- Website development for executive communication with employees
- Discrimination and harassment compliance audit and monitoring
- Accurate tracking of FMLA eligibility with secure internal website
- FAQ section of employee handbook for answering common queries
- Company wide employee satisfaction survey via internal website, publication of results and posting of ongoing improvement plans and results
- Identification of needs of diverse workforce
- Workgroup design for customized customer service delivery
- Electronic performance review for consolidation of reviews from remote sites

BBA,MBA HR….
Examples of six sigma projects:

- Increase job posting hit rate
- Design of job posting templates for recruiters
- Increase retention using exit interview information
- Decrease number of days to respond to applicant
- Use of technicians for some functions performed by engineers
- Decrease use of full security checks when not necessary
- Improved learning module design with self-evaluation sections
- Catalog of available modules for self-learning
- 100% use of off-site safety audits
- Approved generic drug list
- Lowering turnover
  Lost Time / Safety
  Reducing injuries at work
  Improving recruiting time-to-fill
  Quality of our Expertise / Tech. Ability.
  Quality of Employee Attendance.
  Quality of Employee Training / Development.
  Quality of Employee Morale.
  Quality of Employee Retention.

C. BBA,MBA MARKETING….
Examples of six sigma projects:

- Reasons for Six Sigma Success Include: • Focuses on customers and processes • Achieves bottom-line results • Driven by a well defined project selection criteria • Utilizes clearly defined measures of success • Achieves quantifiable financial returns • Uses a disciplined, multifunctional project approach (DMAIC) • Executes projects with manageable completion times (3-6 months per project) • Employs a well-trained team of Champions, Black Belts, and Green Belts. Benefits of Six Sigma Projects Include: • Increased customer satisfaction • Improved profitability by eliminating defects (reduced cost of poor quality) • Enhanced productivity • Reduced cycle times (leading to better customer service) • Improved product and service offerings

BBA,MBA MARKETING….
Examples of six sigma projects

- **Global Accounts and Marketing**
- Improve customer communication processes
- • providing the information customer requested
- • reducing internal processes cycle times ≥40% by assigning ownership and simplifying processes
- • email newsletter project DMAIC
- • Define customer needs via a voice-of-the-customer survey
- • Measure Xerox performance and perceptions vs. competition
- • Analyze VOC data
- • Improve via email newsletter process owner and a new database
- •Control: e.g. 2,734 emails sent 2/5/04, 92% delivery efficiency; newsletter posted on xerox.com

BBA,MBA MARKETING….
Examples of six sigma projects

- ——— **marketing effectiveness dashboard**
- • Deliver web-based, concise marketing performance metrics
- • Opening screen *(next slide) features click-through boxes to drill down to data (sample in the following*
- *slide) in three core buckets:*
- • marketing effectiveness
- • branding
- • customers and the market
- **reduce collateral development cycle time**
- • Weak up-front planning causes expensive revisions, greater agency spend, lost product manager
- productivity and a longer creative cycle.
- • Success will be measured by an overall collateral production spend of 10%.

BBA,MBA MARKETING....
Examples of six sigma projects

- **Parent company auditors found multiple cases of expense abuse and poor reporting**
- **while investigating 3 years of expense records.**
- • Excessive variation in reporting use of company funds claimed as business expenses
- • Thousands of $'s missing and / or unaccounted for
- • The actual extent of loss could only be estimated after interviewing the culprits
- **DMAIC Solution: Basic 6σ tool that applies to everything we do in sales and marketing**
- • **Define problem: missing funds, missing reports, missing receipts, false reports, etc.**
- • **Measure: Found poor managerial systems to track the process.**
- • **Analyze: What is the process, standards for inputs and outputs, process owners?**
- • **Improve: Nine months to get everyone to agree on new processes.**
- •Process outlined, agreed & mapped with accounting dept.
- •Process manager role added to existing position
- •Coordinated with Bank of America's EAGLS system, launched company-wide
- •Standards created for review & audit functions
- •Monthly reporting established with expense auditors
- •Awareness campaign boosts knowledge & sets expectations
- •Company policy web archive established
- •Auditors released for other work
- •Margin disappearance stopped

BBA,MBA MARKETING….
Examples of six sigma projects

- **Control:**
- ☐ Process manager reports to national sales manager
- ☐ Process manager empowered to inspect, intervene & enforce
- ☐ Business ethics position created by Global Ethics committee
- ☐ Compliance definition & tracking better coordinated: legal, accounting & sales / marketing groups
- ☐ New employees orientation changed -- better information about company expectations of funds
- usage & reporting
- ☐ Definitions of defects standardized - auditors & managers
- ☐ Monthly reports by process manager to national sales mgr.
- **Solution sustainability?**
- ☐ Employees' awareness GREATLY increased
- ☐ Role & responsibility of management to monitor, communicate & inspect - better
- ☐ Process mgr functioning as champion
- ☐ Internal capability to know individual "practices" significantly enhanced
- ☐ Process ownership clearly identified.

BBA,MBA MARKETING….
Examples of six sigma projects

- **Multiple communications agencies employed to produce annual product**
- **communications for > 50 brands.**
- • Suspected redundancy of effort and cost, non-coordinated campaigns, off-strategy work,
- inconsistent use of trademarks, missing synergy and staff overlaps.
- ☐ Despite 18 years of success with the lead agency, we realized there was no process map,
- standards, process owner, success metrics, or data comparability across agencies.
- ☐ Our lead agency asked for more business. Our Six Sigma project examined the
- processes and justified the cost savings of consolidation.
- **Analysis defined the process via surveys and interviews, cost analyses, and 2 Black Belts**
- •What is the process? **Communications development**
- •What are the inputs? **Marketing plans, biz objectives, mgr. insights**
- •What is the unit flowing in the process? **Brand message unit**
- •What is the process output? **Product brand messages**
- •What are the standards for the output? **$-effective & on-strategy**
- •Who is the process owner? **Brand manager, marketing mgr.**
- •Process manager? **Agency personnel (?)**
- •Process stakeholders? **Managers & leaders**
- **An example: Tracking costs, we had to go externally to the agencies. Internally, we had simply**
- examined and approved invoices. We had no systems or process mentality to track and
- document the basis on which we could make decisions.

BBA,MBA MARKETING….
Examples of six sigma pro

- **Improvements: We have to properly define the process in order to cut account management**
- costs.
- •Four major agencies terminated; others trimmed.
- ☐ Work definition process = marketing plans
- ☐ Process map created with agency & product groups
- ☐ Electronic routing & approval adopted
- ☐ Process manager designated
- ☐ Cost codes standardized to match process [**168 to 9]**
- ☐ Lead agency process aligned with codes & process
- ☐ Reporting & tracking by business unit
- ☐ Accountability enhanced with more relevant data
- **Control: The agency started tagging costs according to each costs' step in the communications**
- process

BBA,MBA MARKETING….
Examples of six sigma projects

- **Sustaining the gains by:**
- •Concentrating ALL work in *-1- agency.*
- •Clarifying PROCESS phases (added **DEFINE) & work output standards.**
- •Utilizing standardized Cost Elements in billing & reporting.
- •MEASUREMENTS discipline -- a mentality & a NEW process step.
- •Directing work via **MARKETING PLANS – by value score**
- •Achieving "buy-in" from the lead agency on value of changes & processes
- ☐ Roles & responsibility of management to monitor, communicate & inspect much improved
- ☐ Internal interest in process discipline and data-driven decisions improved.
- ☐ Agency very cooperative and committed - more at risk
- ☐ Process ownership better defined & assigned.

BBA,MBA MARKETING....
Examples of six sigma projects

- **Sales Force Deployment**
- • **Specialized sales force is covering same territory as traditional sales team.**
- **Cost redundancy? Balanced deployment? Efficiencies lost?**
- • **4 different specialized sales forces share the same geography, the same distributor**
- **accounts and the same retail dealers and exhibit vastly different levels of productivity:**
- **as much as 425% variation between top and bottom full-time territories.**
- **Solution:**
- • **Analyze balance of sales force deployment, by territories, sales levels and other key**
- variables, overlaps, task complexity, workload, etc.
- • **Improve balance.**
- ☐ Process outlined & mapped
- ☐ Process 'operator' designated
- ☐ Standard definitions for data adopted
- ☐ Key crops identified based on specific, agreed criteria
- ☐ Crop segment managers identified & role defined
- ☐ dBase administration clarified and corrected
- ☐ Marketing plan template refined with product manager and market research agency to include sales
- rep inputs AND measures of potential
- ☐ 2 territories combined at savings of at least $300,000.

BBA,MBA MARKETING….
Examples of six sigma projects

- **Solution sustainability?**
- ☐ Product manager / district manager buy in!
- ☐ Key market researcher supports use of sales rep. data in his market assessments
- ☐ Sales rep data also included in marketing plan
- ☐ Sales rep input processes unchanged
- ☐ Other sales specialties re-deployed people based on project analysis and outcome
- ☐ Generated interest in other sales related projects that continues even today.

BBA,MBA MARKETING….
Examples of six sigma projects

- **Systematic innovation: Generate and define more ideas**
- linked with market opportunities in a structured way.
- • **Manage risk better: Identify critical issues early in the commercialization**
- process such that plans can be developed to mitigate
- or eliminate risk going forward.
- • **Higher return yield from a project portfolio: Avoid overloading**
- resources with too many low-risk, small-gain projects
- through a discriminating selection process. Select fewer
- projects—the "best fit" projects, not necessarily the easiest
- projects.

D.BBA,MBA FINANCE ….
Examples of six sigma projects

- **Common Lean Six Sigma Implementation in Finance and Banking are listed below**.
- Reducing Financial Risk
- Simulation for financial decisions
- New product design of financial instruments
- Improving portfolio strategy
- On operational level -
- Reducing documentation errors
- Improving the reconciliation processes.
- Reducing response delays.
- Reducing or eliminating invoicing errors
- Eliminating the possibility of erroneous data entry
- Reducing audit non conformities.
- Reducing salary issue turn around time
- Control spending over time
- Reduce electronic financial transaction costs.
- Reducing complaints.
- Enhancing (internal or external) customer satisfaction

BBA,MBA FINANCE ....
Examples of six sigma projects

- Improving customer feedback and response processes
- **Loan Department**
  1. Reducing the cycle time to Process a Loan Application (both Mortgage & Personal loans).

  2. Improving the Customer Information gathering processes.

  3. Improving the Credit Evaluation Process

  4. Improving Productivity of loan processing agents

Account Opening
1. Reducing the time to open an account

2. Reducing errors in account opening process.

3. Reducing rework in processing customer applications

Other Projects in Retail Banking
1. Reducing the Credit Card Delivery time.

2. Reducing Bank Statements Processing & Delivery time.

3. Reducing the errors in money transfer

4. Improving accuracy, timeliness and completeness of customer communication.

5. Developing new products (timeliness, business potential)

6. Improving Market Share of existing banking products.

7. Improving the Branch Banking Processes