

SUMMARY OF “BREAK OUTS” DURING THE CREATIVITY-INNOVATION PORTION OF THE 2012 ASFE SPRING MEETING

INTRODUCTION

During the 2012 ASFE Spring Meeting, which was held on April 19-21 in Orlando, Florida, author, speaker, and independent consultant Stuart G. Walesh, PhD, PE, presented “Benefits of Developing a Creative/Innovative Culture in Your Firm.” In addition to showing many and varied benefits of such a culture, Walesh described how basic knowledge of the way our minds function coupled with collaboration tools will enable us to be even more creative and innovative and reap those benefits. The 90-minute session included a 20 minute break out during which small groups of participants had an opportunity to apply, in a preliminary fashion, some of the creativity-innovation tools. This summary of the break outs, which was prepared by Stu Walesh, enables meeting participants as well as those who could not attend the meeting, to share in the many ideas that were generated. All team inputs are quoted, that is, not edited with the exception of not repeating duplicates.

Specific facilitation tools used by the various break out groups are named (e.g., Borrowing Brilliance). For descriptions of the tools, see the presentation “Benefits of Developing a Creative/Innovative Culture in Your Firm” which is available here: <http://www.asfe.org/asset/file/ASFESpring2012Presentations.zip> (the file is sp12walesh.pdf).

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See also www.HelpingYouEngineerYourFuture.com.

Many creativity-innovation tools are described in Stu’s latest book *Engineering Your Future: The Professional Practice of Engineering*, Wiley and Sons and ASCE Press, 2012. See Chapter 7, “Quality: What Is It and How Can We Achieve It?” For more information about the book, click here <http://www.wiley.com/WileyCDA/WileyTitle/productCd-047090044X.html>

**The following results of many brief introductory experiences
applying the creativity-innovation fundamentals and tools
to mostly hypothetical situations
only begin to suggest what could be accomplished
with in-depth applications of those tools
to your organization’s issues, problems, and opportunities.**

BREAK OUT 1: PURSUING A NEW INDUSTRY OR PROJECT TYPE

Background

Deltek, a provider of software for professional service firms, recently commissioned ZweigWhite to survey the E/A industry to “identify what—if any—changes they are making to internal firm operations.” According to Deltek, “beginning in 2008, architecture and engineering firms encountered the worst economy since the Great Depression.” In that context, Deltek facilitated the survey because they wanted “to understand how firms plan to be successful in 2012.” Deltek reported that “70 percent of respondents said that increasing business development is their highest priority in 2012.” Under business development, the highest priority identified by the responding firms was: “Pursuing a new industry or project type.”

Team Ideas (using Borrowing Brilliance) for Ways to Pursue a New Industry or Project Type

- Teach new clients (e.g., campus) that they need comprehensive site plans (e.g., 3D – utilities, buildings, soils info) for planning and feasibility uses. All info goes into graphical format for all to use.
- Equity ownership in projects
- Expansion of services to manage risk beyond those associated with subsurface
- Bill as percent of project value
- Fast delivery of product
- Economical
- Educating about what you need
- Unique brand/visible logo
- Use Sharepoint or other software to provide options for design (e.g., foundation) for client consideration (i.e., fast, cost-effective communication with clients)

BREAK OUT 2: FINDING A NEW BUSINESS DEVELOPMENT PROCESS

Background

See the description of the Deltek survey included above in Break Out 1. Recall that Deltek reported that “70 percent of respondents said that increasing business development is their highest priority in 2012.” Under business development, the third highest priority identified by the responding firms was: “Finding a new business development process.”

Team Ideas (using Borrowing Brilliance) for Finding a New Business Development Process

- McDonald’s (consistent product and service, responsive, drive thru vs. walk in, package things for savings, continuity of service – discount for bundled service)
- Google (be a resource rather than we don’t do that – Google gives an answer, instantaneous resources, be seen as the resource in your niche, use technology – have them go through you as the place to get answers, know more about what you do)
- Apple (customer service – schedule a time to call you rather than holding, taking care of customer beyond what is expected, replacing equipment – customer for life because you took care of problem, creating a customer for life rather than selling a product, sales people empowered to resolve issues)
- IKEA (simple, practical, meets certain needs, customer and does work to their level of comfort)
- Sports team (brand like Pittsburgh Steelers, attract certain talent, known for certain things, connection to community/heroes)
- Disney (have a magical day, consistency of service)
- Travel agencies (have been commoditized by computer, focus on niche/more challenging travel experience and saving time)
- Collaborate with clients/competitors on strengths
- Restaurants that don’t serve kids – focus on your market
- Receptionist knows names, who they work for, great personality

BREAK OUT 3: EMERGENCY FLOODPROOFING OF A MANUFACTURING PLANT

Background

A manufacturing plant sits on the floodplain of a river in a northern climate. The building is a 100,000 square foot, single story, concrete block structure sitting on an on-grade reinforced concrete slab. The principal product of this manufacturing facility is aluminum castings. These castings are shipped to two other plants where they are used to manufacture small gasoline engines. Many containers of molten aluminum are scattered throughout the plant. The operation of this plant affects thousands of employees in the three plants and is critical to the local economy.

As of February 1, the large watershed tributary to the plant's location contains heavy snow cover and warmer weather is approaching. Flooding threatened the building in the past and in the most serious event flood waters rose within inches of the concrete floor. Given the past history and this year's unusually heavy watershed snow cover, company management is very concerned about the need to quickly take preventive action. They want to keep the manufacturing going as long as possible balanced by their concern with their employees and the facility. Your engineering firm has been retained, as of February 1, to prepare an emergency floodproofing plan to protect the building, its equipment, and the employees. Your plan must be ready in two weeks for review by company management with the idea that it will be immediately implemented.

Team ideas (using Brainstorming) for Ways to Quickly Floodproof the Building

- Concrete floodwall
- Sheet pile wall
- Earthen berm, temporary or permanent
- Snow berm
- Aluminum and/or inflatable barriers
- Re-route channel/use excavated material for berm
- Abandon part of building for storage or channel
- Sand bags, Jersey barriers
- Pumps inside, outside, dry wells
- Raise equipment off floor
- Detention ponds
- Excavate ponds
- Swales
- Slough
- Upstream control – premelt snow, haul off snow, compact snow
- Long term – pump transfer for irrigation, create recreation site, move plant, wetland bank, upstream dam, levee protection

BREAK OUT 4: POSSIBLE CAUSES OF BRIDGE FAILURE

Background

A major bridge just failed, with loss of life and great disruption of river navigation and of auto traffic. Your engineering firm was immediately retained to analyze the failure and determine its cause or causes. Your interdisciplinary team (e.g., engineers, surveyors, divers, etc.) just made an initial one hour visit to the site to view the failure. Before proceeding with your analysis, the team meets to plan its approach. The first thing you do is construct a fishbone diagram.

Team Ideas (using Fishbone Diagramming) of Possible Causes of Failure

- Original design (structural, geotechnical, design criteria, design errors, design flaws, foundation)

- Maintenance (frequency, thoroughness, erosion, inspection, corrosion)
- Environmental/natural (seismic, corrosion, river flow and conditions, flood, snow load, ice load, landslide)
- Unusual/unexpected events (accident, vandalism, terrorism, stealing materials, barge hit, settlement)
- Poor construction (low quality materials, lack of oversight)
- Change in use (heavier loads, development in area, river traffic)

BREAK OUTS 5 AND 6: MULTIPLE USES OF HIGHWAY MEDIAN BARRIERS

Background

Concrete and steel barriers are routinely used between opposing lanes of high speed highways. They serve the single purpose of greatly reducing the likelihood of head on collisions. Imagine that your team is in the very early stages of planning and designing a high speed highway system for a developing country. Median barriers are necessary. However, perhaps the barriers, or more precisely, a barrier system, could provide the opportunity to cost-effectively serve multiple purposes. That is, maybe the barrier system could fulfill multiple infrastructure and other functions.

Team Results (using Mind Mapping) of Multiple Uses of Median Barriers

- Sound walls
- Flood walls
- Anchor for floating wall
- Channel for flood routing
- Lights
- Murals/graffiti
- Buildings above the roadway
- Decorative planters
- Stacked highway lanes – only one -way traffic
- Train/light rail
- Elevated platform for bikes, pedestrians, and trains
- Bus lanes
- Animal corrals
- Convey sewage
- Convey drinking water
- Convey power or fuel for power – safety if ruptured
- Storage of storm water and potable water
- Fish farm
- Transport barges
- Convey drinking water
- Wind turbine barrier
- Cable with towers
- Construction/product/material storage/maintenance materials
- Reuse road spoils for barrier
- Wetland for surface water treatment
- Trees or tall sturdy vegetation – bamboo – cut down for building material
- Ranching – livestock grazing
- Crops for fuel
- Crop for food
- Stone barrier
- Mining – use spoils for barrier
- Refuse barrier – recycled material, not necessarily concrete or steel

- Cables
- Plastic
- Timber
- Landfill
- Advertising – funding mechanism
- Instructions, directions, route guides
- Utility paths and utility protection
- Animal control, vector control
- Communication towers
- Alternative energy producer – solar/wind
- Absorb energy

BREAK OUT 7: POSSIBLE CAUSES OF STRUCTURAL FAILURE DURING AN EARTHQUAKE

Background

A major earthquake occurred in the Sichuan area of China in 2008. Major structure damage occurred with great loss of life – over 70,000 people died. Imagine that, shortly after the earthquake, your engineering firm was retained to analyze the many structural failures and determine the major cause or causes of the failures and the loss of life. Your interdisciplinary team (e.g., engineers, surveyors, geologists, etc.) reviewed some photos and other information prior to traveling to China. You arrived in the Sichuan area of China yesterday and you are meeting today before going out to look at the damage. Before proceeding with the field investigation part of the project, your team constructs a Fishbone Diagram of possible causes of failure and resulting loss of life. You do this so that you try to imagine all the possible causes before actually looking at the collapsed structures. You want to make sure you do not miss any possibilities.

Team Ideas (using Fishbone Diagramming) of Possible Causes of Failure

- Design (site conditions, foundations, lack of repair, code requirements, standard of care)
- Construction (material quality, workmanship, inspection, lack of inspections, maintenance, means and methods, age, type – timber, concrete, masonry)
- Lack of warning system (alarms, public awareness – what are they trained to do?)
- Size of earthquake (size, duration, location, aftershocks, types of movement, spectral response)
- Subsurface conditions (soil properties, ground water, rock, fills)
- Utilities (gas, power, water)
- Post event housing (treatment, food, water)
- Other (maximum capacity of building, actual occupancy, first responders, time of day, hospital-school-business-residential-storage, location of buildings)

BREAK OUTS 8 AND 9: REDUCING STREAM TURBIDITY CAUSED BY MAJOR CONSTRUCTION

Background

A non-navigable stream flows into a reservoir. Several major construction projects will occur within the watershed upstream of the reservoir during 2013 and 2014. On-site erosion control will be implemented to reduce the transport of suspended solids into the stream system and the reservoir. However, given the many uses of the reservoir, citizens and officials are concerned that the on-site erosion control measures will not trap sufficient suspended solids and potential pollutants adsorbed onto the suspended solids. The important reservoir water uses may be at risk. Therefore, a back-up suspended solids “control” is to be designed and implemented on the stream between the development sites and the reservoir. Your engineering firm has been retained to develop a list of initial ideas for the

“control.” The first thing you do is conduct a brainstorming session to develop many ideas – shoot for quantity, not quality.

Team Ideas (using Brainstorming and Mind Mapping) for Ways to Control Suspended Solids and Potential Pollutants

- Add vegetation
- Slow stream flow/lengthen
- Retention ponds
- Identify stakeholders
- Wetland detention
- Better construction controls
- Identify sources of pollutants
- Identify potential failures
- Design for 100-500 year
- Silt fences
- Hay bales
- Check dams
- Underground detection
- Treatment plant (flocculating agent, filtering)
- Enlist Trout Unlimited expertise
- Consult mining professionals
- Consult erosion control specialist

BREAK OUT 10: OTHER APPLICATIONS OF THE Q-DRUM CONCEPT

Background

The Q-Drum – a wheel that is a container or a container that is a wheel – is used to transport water in developing countries. It is a very effective way to reduce the physical stress on individuals, many women and children, while increasing the volume of water they can convey. The actual Q-Drum, or the concept of a wheel-container, might have other applications. Could it, or the concept, provide better ways of doing things in natural disasters, the military, agriculture, mining, lawn care, transportation, boating, construction, manufacturing,?

Team Ideas (using New Point of View) for Other Applications of the Q-Drum or the Concept

- Military (transport explosives/water, temporary floating bridge)
- Natural disaster (food transport, stack to create temporary dam)
- Transportation (crash/separation barrier)
- Agriculture (Transport and spreading of seed)
- Construction (Static roller for compaction of soil)
- Boating (buoys and markers, emergency flotation device, line up to create dock)

BREAK OUTS 11 AND 12: CONQUERING COMMODITIZATION

Background

ASFE’s Strategic Plan for 2012-2015 states, as part of its planning context, that “Marginalization and **commoditization** are critical business issues challenging the welfare of geoprofessional firms.” In a similar manner, Norman R. Augustine, former chairman and CEO of Lockheed Martin and former chairman of the National

Academy of Engineering, writes “Distance is dead.” He elaborates by noting that “...**routine engineering has become a commodity**. There will never again be a shortage of engineers in America to perform routine engineering functions. Such work will simply be shipped abroad—at the speed of light—to the hordes of engineers now being produced in several other countries.” More hopefully, Augustine goes on to say “But there will always be demand for superbly-educated engineers who are capable of performing in an **innovative, creative**, and entrepreneurial fashion.” In a world of forces that push toward the commoditization of everything,” according to journalist Geoff Colvin, “creating something new and different is the only way to survive.” How can engineering firms conquer commoditization? Is their very existence at stake if they don’t?

Team Ideas (using Mind Mapping) About Ways to Conquer Commoditization

- Adding a new service
- Different output format (executive summary in reports)
- Communication to clients (handwritten notes, social media, early involvement in project, electronic recording/uploading)
- Adding new equipment
- Educating clients (lunch and learn, get them to understand that they need your service for more than just code compliance)
- Train field personnel to do more (survey people can evaluate wetland potential)
- Knowledge of area regulations
- Consultant saves money by using one firm for several phases of work
- Consultant must refrain from engaging in commoditization
- Use different marketing techniques

BREAK OUT 13: RENOVATION AND REUSE OF A MAJOR PUBLIC WORKS STRUCTURE/FACILITY

Background

The **physical** life of an engineered structure or facility, or any of their major components, is defined as the time over which the structure, facility, or component could perform its intended functions, assuming reasonable, but not extreme care. **Economic life** is the period of time during which incremental benefits of use are likely to exceed incremental costs. In other words, the economic life of a structure, facility, or component ends when the incremental benefits of use become less than the incremental costs. Clearly, determinations of physical and economic life are judgments. Of importance here is the observation that the **economic life** of an engineered structure or facility **is usually significantly less than its physical life**. For example, tanks, pipes, and other components in a wastewater treatment plant may have physical lives of up to 50 years, but given the rate of change of treatment technology, significant improvements are likely to occur in the time span of much less than 50 years (Walesh 2000).

Assuming a structure or facility that has reached its economic life will not be renovated to continue to perform its original function. Then various parts of a structure or facility will typically have salvage value. However, the entire structure or facility, or major parts of it, might be renovated for a completely new use for public socio-economic-environmental benefit.

Team Ideas (using A New Point of View) for a Completely New Use for an Outdoor Swimming Pool and Complex

- Engineered wetland
- Contemplation garden
- Rescue training facility
- Urban garden (food source)
- Inner-city fish farm (aquaculture)
- Entertainment/amusement complex

- Playground

Team Ideas (Using a New Point of View) for a Completely New Use for a Ski Jump

- Water slide
- Community garden
- Amusement park ride
- Waterfall/restaurant
- Hang gliding facility
- Storm water treatment/biofilter
- Pump storage
- Solar panel/array
- Cell tower