

SAFETY BIOPHYSICS LEADERSHIP Recycling Energy & Removing Barnacles

By Robert Pater

We are all governed by physics and biology. Einstein made it clear that everything, including persons and organizations, is essentially comprised of energy and movement. Understand principles of nature and they can be harnessed; don't and they can trap or backfire.

One physics example is perpetual motion, “set it and forget it.” This does not exist in nature, much as we might wish it. Inconveniently, taking for granted or ignoring what seemed to be working leads to deterioration. This is also true in organizations, doubly so for safety, both with equipment and within people.

Even “stainless” steel rusts, rubber gaskets harden then fail, new-but-unused batteries leak, fresh foods mold. Similarly, have you witnessed previously enthusiastic employees become disillusioned, even embittered? Lao Tsu advised, “That which is not growing is dying”; decay happens unless compensated for.

Despite this, there is a common tendency to assume “one is done,” that after a problem has been addressed it stays fixed. Often followed by the surprise or disappointment that the previous status quo has not stayed the course, strong engagement

witers, attention to safety messages flags, safe actions decline, machinery that is not returned can fail and create hazards just as unchecked nonskid mats can wear down and actually contribute to slipping.

Here I am reminded of the corporate safety director who proudly related how his crews would travel hundreds of miles to a worksite, rig up, then get right back in their trucks to drive further distances to their next gig. When asked about incidents and injuries, he responded, “Oh, they’re used to it.” And many of them seemed to be, until they weren’t.

Before pointing fingers at workers for being mentally slack, consider this: Taking decent results for granted, hunkering down or just holding on exemplifies leadership complacency. Safe, effective operations will not keep humming without additional inputs of energy (including maintenance or renewal). Entropy—the tendency to devolve toward breakdown or disorder—erodes everything over time. *Encyclopedia Britannica* defines entropy as “the measure of a system’s thermal energy per unit temperature that is *unavailable for doing useful work*” [emphasis added]. Entropy is directly addressed in the second law of thermodynamics, which speaks to the transfer of energy from one place to another and from one form to another. How might this refer to injury-reduction and to safety culture overall?

Two-Way Energy Approaches to Sustainable Safety

Consider applying principles from both physics and biology toward next-level safety. Following are two such principles.

1) Applied Safety Physics: Sparking, Then Recycling Energy

I have written several articles about the critical power of energy in elevating safety, which is too often energy deficient. I suggest thinking of thermodynamic safety as efficiently maximizing change receptivity and actions while minimizing the heated spill off from pushback, resistance or the distancing of disengagement.

I have seen where protecting against performance falloff is often overlooked by otherwise high-level leaders who seem narrowly focused on making ever-new inroads in pursuit of growth. In contrast, wisest leaders employ a two-way strategy, like two hands clapping. Sure, they incorporate ongoing improvements but simultaneously toward strengthening previous gains, averting safety erosion.

Alternate ways to think about energizing:

•**Old-style leadership.** This is like manually churning an ancient generator to get energy, and

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STEPS TO SUSTAIN SAFETY PERFORMANCE

- Reinvest energy continuously:** Safe, effective operations will not continue humming without additional inputs of energy.
- Prevent performance drop-off:** Often the best way to maintain a continuous high performance level is to keep improving, warding off entropy drop-off.
- Monitor safety regularly:** Keep monitoring safety morale, motivation, leadership or culture on many levels and in many ways. Don’t merely rely on occasional surveys.
- Refresh safety messaging:** Continue to regain attention, interest or applications of safety in creative ways, going beyond the same old things.
- Repurpose resistance:** Utilize and repurpose resistance or complacency rather than attempt to quash or override or ignore these.
- Address safety “barnacles”:** Look for where safety barnacles occur in the company and for patterns of repeat barnacle formation.
- Avoid wasting energy:** Steering in useless directions and over-running (continuing a safety intervention that no longer garners attention).
- Engage with creative solutions:** Employ a range of transmissions and invitations that vary in look but are consistent in direction.
- Turn complacency into progress:** Assess whether lack of buy-in is caused by factors that were missing or disregarded in planning or implementation, and whether resistance can be redirected toward strengthening safety programming.

By applying practical physics and biological principles, leaders can recover otherwise wasted energy by redirecting negativity and resistance toward renewing safety.

when the cranking stops so too does the electrical output. This can be repeatedly pushing, reminding, “rah-rah” coaching or carrot-and-stick motivating safety from without. It is hard to get sustained improvements, minimally thankful with capped effectiveness that is especially diminished when leaders cannot ongoingly reach and monitor people who might work out of sight, remotely, on client’s turf, in the field or have at-home safety exposures. Kurt Lewin’s research on superchargers corroborates the limitations of attempting to externally power others to keep up or to change.

•More efficient leadership for current times.

It is possible to recover energy by initially getting motion started that “primes the pump” with a relatively small input to disrupt inertia, then recycling potentially lost energy into gain. Some facilities do this, rather than dispelling heat generated from the manufacturing process, they redirect it back internally, either into running machinery or toward a comfortable working climate,

Often the best way to maintain a high performance level is to keep improving, warding off entropy drop-off. Consistent with this, regenerative braking (“regen”) is a physics application where an electrical or hybrid car commonly recovers kinetic energy that may otherwise be wasted and is then converted into electrical energy; that is, recapturing the energy produced by slowing toward recharging the vehicle’s battery.

Applying this to safety, here’s where leaders might “press the brakes” to add energy to their system and culture. For example, monitoring then reducing:

- over-running (continuing a dead-in-the-water safety intervention that might have garnered attention at one point but no longer does)
 - steering in useless directions. Setting leading indicators can greatly aid aiming implementations; watching indicators leads to making as-early-as-possible course corrections to conserve otherwise wasted motions.
 - simultaneously accelerating and slowing that otherwise signals mixed messages that undercut safety.
 - revving too much, pushing too hard, imparting, telling or convincing rather than extracting, drawing out or promoting self-convincing. (Note that just as a car’s regen considerably augments efficiency of battery life and range but does not replace regular mechanical braking, “regenerative safety” maximizes performance but does not supplant the need for basic policies, procedures and standards.)
- Further potential safety regen applications include:
- Keep monitoring safety morale, motivation, leadership or culture on many levels and in many ways. Don’t merely rely on once-in-a-great-while surveys or any other one-shot vehicles.
 - Continue to regain attention, interest or applications of safety. Look for creative ways to do this, going well beyond the same old things. Employ a range of transmissions and invitations that vary in look but are consistent in direction.
 - Utilize and repurpose resistance or complacency rather than attempt to quash, override or ignore

them. Could lack of buy-in be caused by factors that were missing or disregarded in planning or implementation? Can resistance be redirected toward strengthening safety programming?

•Go beyond a simply prevention-only mindset in safety performance and culture toward offering positive benefits to workers and managers, rather than merely the absence of something that might happen that they may not believe will happen to them.

Some questions for further consideration: Where is energy dissipating or leaking out? What is wasted or not getting attention or responsiveness? Where is transfer of energy not taking, being blocked, is frayed or where a disconnected circuit may be? Where is energy being boosted? Does this transfer to other arenas, departments, sites or business units? If so, how? In what ways is it unlikely to transfer?

2) Applied Safety Biology: Removing “Barnacles”

Seafarers and boaters know that barnacles happen and they slow movement. Not only that, barnacles can potentially damage a boat.

National Ocean Service (2024) explains:

Barnacles are sticky little crustaceans related to crabs, lobsters and shrimps. They stick to the undersides of vessels, to other sea life, to each other and to pretty much anything they come in contact with. They secrete a fast-curing cement that is among the most powerful natural glues known. Large barnacle colonies cause ships to drag and burn more fuel, leading to significant economic and environmental costs. The U.S. Navy estimates that heavy barnacle growth on ships increases weight and drag by as much as 60%, resulting in as much as a 40% increase in fuel consumption.

“Barnacles” routinely accumulate in organizational safety. Taking the form of complacency (which can happen on all company levels), disconnection, resistance, purposely following policies to the bare minimum, or unconsciously shirking or actively undercutting safety directives or procedures. All of which drags and degenerates progress toward improving safety, health, motivation and overall performance.

Some questions to consider: Where do safety barnacles occur in the company? Are there patterns of repeat barnacle formation and, if so, in which departments, business units or shifts and with which supervisors, managers or workers? Do they seem perpetually in place, or are they regularly scraped away (not necessarily by severing them from the company)?

In practicality, Kurt Lewin’s melt-move-refreeze strategy works well for changing even entrenched behaviors with organizational barnacles. Think of moving a block of ice from an inappropriate place to a more suitable one. Essentially this involves 1) melting or unfreezing (by showing in no uncertain terms that their actions do not work or are no longer acceptable), 2) moving (helping them adopt a

changed stance toward the desired direction, even if with small steps) and 3) refreezing (reinforcing their newly adopted actions, continuously at first, then intermittently). Like every other leadership method, this is as much art, or how you do it, as science (just intellectual technique).

But in fact, prevention is better than cure. Consider this point about barnacles:

Instead of laboring to remove barnacles once they have attached to your boat, you can start by making it difficult for them to glue on in the first place. You can do this by regularly inspecting the hull and removing them as soon as they appear, so you don't have to invest in expensive solutions. Or you can use an antifouling paint. . . . that contains chemicals that stop the barnacles from attaching. (Scout Boats, n.d.)

Similarly, most safety leaders would arguably agree that averting incidents is far better than healing from them (if even possible). Highest-level leadership goes even further, turning parasitic relationships (barnacles) into mutualistic ones that benefit both sides—from “negative-no-way, no-how” or disbelievers or naysayers into positive forces. Some ways to apply this in safety include:

1) Activate resistant or passive managers, executives or supervisors toward being safety proponents (through relationship building and listening or aligning safety strategies with their own needs).

2) Train and employ dissident or disconnected worker-leaders as internal safety catalysts or advocates (see my article, “Leading Safety From Within: Training Internal Safety Catalysts,” *Professional Safety*, June 2023)

3) Enlist those corporate clients or vendors who might have similar needs that can align with yours toward common safety destinations.

Two-Way Safety Energy Toward Self-Fitting Next-Step Leadership

To better optimize safety energy for performance and culture, consider asking or challenging yourself and your team with these questions:

- How might we become more safety-energy aware, rather than only or predominantly focused on process or equipment?

- What are some ways to recapture or recycle energy that ebbs or is lost toward greater safety awareness and performance?

- How might we implement safety to be as self-regenerating as possible (Hint: Redirect it from being predominantly expert driven toward more internalized; more from inquiring or drawing out, less from imparting or telling)?

- What or where are our existing safety barnacles that inhibit or even damage performance? Where are we degenerating? What, who or where are the critical people or operations that have been taken for granted? How might we best remove or scrub off these barnacles (without simultaneously hurting our

overall “ship”)? How can we prevent these or similar barnacles from becoming firmly attached in the first place? What stops momentum? What confuses people in our safety approach or communications? What are obstacles to safe, smooth performance or to reporting, administering and performing safety?

Many leaders find themselves increasingly pressed to be more efficient with their time and other resources. By applying practical physics and biological principles, we have seen time and again how readily leaders can recover otherwise wasted energy by redirecting negativity and resistance toward renewing safety. **PSJ**

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