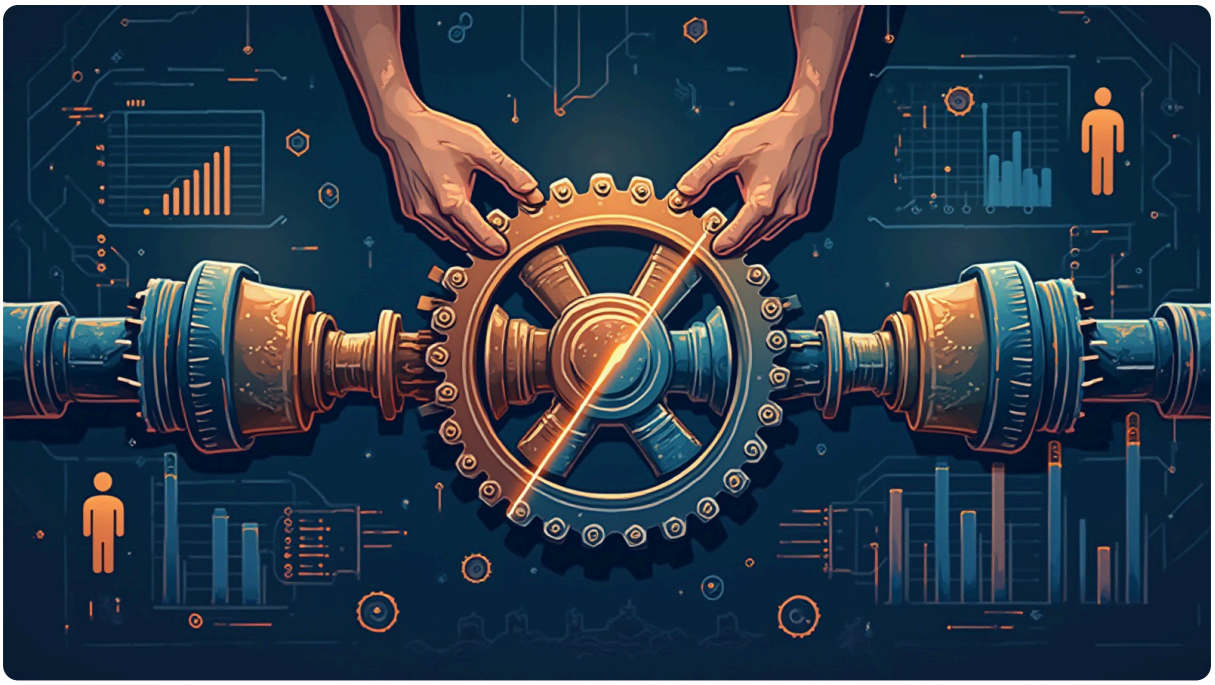
OPERATIONAL RESILIENCE NEWSLETTER

When the grid fails: Managing transitions, not just outages.

The true risk is in the moments between power failures and restored service.

operations management · lean six sigma · resilience · power systems

> The newsletter for operations managers who prefer sequencing logic over expensive guesswork.



The Hard Truth About Power Loss

A backup generator is not an operational strategy; it is just a piece of heavy machinery that keeps the lights on. I have seen many plants invest hundreds of thousands into massive diesel engines and industrial-grade generators, only to realize too late that while they solved the problem of "no power," they did nothing to solve the problem of "broken process."

When the grid fails or a circuit trips, the primary danger isn't just the darkness. The real risk is the transition—the messy, unpredictable seconds and minutes between the loss of main power and the activation of backup systems, and more importantly, the period when those systems have to talk to each other again.

A generator might keep a motor spinning, but it doesn’t automatically re-establish the handshake between a PLC (Programmable Logic Controller) and its neighbor on the line. It won't clear a jammed sensor caused by a momentary voltage sag. It won't recalibrate an automated weighing scale that lost its zero point during the switch. If your plan is simply "have enough power to keep running," you are

ignoring the most dangerous part of the event: the moment when the system has to decide how it fits back together after being pulled apart.

Identifying the Interdependency Blind Spot

Most manufacturing failures in these scenarios stem from a specific misunderstanding I call **The Silo Fallacy**. This is the belief that because your electrical, IT, and production teams are all "working," their systems are independent of one another during an outage.

In reality, modern lines are a web of dependencies. A conveyor doesn't just need power; it needs to know its position in the sequence. A robot arm doesn't just need electricity; it needs a constant heartbeat from the safety circuit and a clear signal from the vision system. When you treat "power" as an isolated utility, you miss the fact that your production flow is actually dependent on a continuous chain of data handshakes.

The Comfortable Rationalization	The Underlying Reality
"The generator keeps the machines running."	The machine stays on, but the logic and communication layers may have crashed or desynchronized.
"We just need to reboot the system after a flick."	A manual reboot requires an operator to physically walk 20 stations to reset individual controllers in a specific order.
"The UPS handles the critical electronics."	The UPS keeps the PC on, but it doesn't keep the motor running or the pneumatic valves open during the transition.

When you fail to see these links, you aren't building a resilient system; you are just delaying the inevitable stop. You aren't solving for "uptime"; you are only postponing the moment of failure.

What Actually Happens During a Transition (The Failure Anatomy)

I’ve stood on lines where the power flickered for three seconds—hardly enough time to blink—and yet, it took four hours to get back into production. Why? Because the transition was unmanaged.

When electricity is interrupted or switched, components don't always behave gracefully. A motor might experience a "dirty" start that causes a mechanical jerk. A PLC might reboot in three seconds, but its neighbor—due to a slightly different cycle time—might take ten. For those seven seconds, they aren't talking. They are silent. If your logic requires them to be in sync to move a part, the line stops.

Furthermore, we often overlook the "noise" of a transition. A power switchover can create electromagnetic interference or a surge that trips sensitive breakers further down the line. Then there is the physical reality: many machines require a specific sequence to restart safely. If you try to start every motor at once when the generator kicks in, the massive inrush current can trip your main breaker again.

The failure isn't usually caused by the lack of power; it’s caused by the **Uncoordinated Restart**. It is the difference between a controlled transition and a chaotic "re-homing" exercise where operators have to

manually move parts from one station to another because the automated system doesn't know where anything is anymore.

How Operational Resilience Should Be Designed

To build a truly resilient process, we must stop thinking about power as a utility and start treating it as a state of operation. You need to design for "Seamless Transition" rather than just "Backup Power." This requires moving toward three distinct pillars: Load Auditing, Decoupling Strategy, and Recovery Sequencing.

Load Auditing means identifying what *must* stay on to maintain the safety and integrity of the product. Not every motor needs to be on a generator. If it’s a non-critical conveyor that only moves parts between two stations where they can sit for ten minutes, let it go dark. By narrowing your scope, you simplify the transition.

Decoupling Strategy is about isolating failures so they don't travel. If an upstream sensor loses its connection to the local network during a power swap, does that stop the entire plant? Or can that section of the line operate in "Island Mode" until it catches up with the rest of the system? You want to build walls between systems so that one transition doesn't cause a total collapse.

Recovery Sequencing is the most overlooked step. This is your playbook for what happens when the lights come back on or the generator takes over. It’s a scripted, rehearsed sequence: *Step 1: Verify primary communication; Step 2: Clear and home the robots; Step 3: Restart conveyor A before B.* You aren't guessing how to restart; you are following a script designed for the specific quirks of your hardware.

Three Steps for Building a Resilient Process Plan

If you want to move from "hoping it works" to "knowing it works," start with these three steps:

1. **Map the Dependency Chain.** Walk the line and map every piece of equipment not just by its power source, but by what it needs to *talk* to in order to function. If a motor is on a generator but its control logic is on an AC circuit that fails during a switchover, you have identified a gap. You must identify these "handshake" points where the flow of information breaks when the flow of power changes.
2. **Define your Critical Load & Islands.** Determine what actually needs to stay powered to prevent damage or safety risks. Then, physically and logically decouple those systems from non-essential ones. If a system doesn't need to be "live" during a transition but can be manually restarted later, move it out of the immediate recovery loop. This reduces the complexity of your automated transitions.
3. **Script the Recovery Sequence.** Create a literal step-by-step checklist for every major cell on your floor. This should be posted at each station. It shouldn't say "Restart_Procedure.exe"; it should say: "1. Check Gate 4 is clear. 2. Power up PLC 05. 3. Wait for 'Green Light' from Unit

B before engaging Motor C." Every operator must know the sequence so that when a transition happens, they aren't making decisions; they are following instructions.

Daily Action: Making Resilience Standard Work

Don't try to overhaul your entire facility's electrical architecture this afternoon. Start by making resilience part of your standard work on the floor.

This week, perform one "Transition Walk." Pick one section of the line and ask these three questions:

- If this specific motor loses power for ten seconds, does the neighboring machine still know it's there? (The Handshake Check)
- Does the operator at this station have a clear instruction on what to do if the system "hiccups" during a restart? (The Instruction Check)
- Is there any piece of equipment here that is currently "over-complicated"—meaning it's part of an automated sequence but doesn't actually need to be for the process to remain safe? (The Simplification Audit)

Focus on one station per week. Fix the labels, clarify the restart instructions, and identify where a lack of communication will cause a multi-hour delay during a simple power flicker. Stop managing for "perfect" conditions; start managing for the moment things go wrong.

Call to Action

What is the most overlooked transition point in your facility? Share your experience with us at newsletter@sixsigmakaizen.com or tag a colleague who needs this diagnosis.

Newsletter replies: newsletter@sixsigmakaizen.com · X: @kaizen_6sigma

Stay curious, stay improving,

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References: Source Article: When the Grid Goes Down