**SHNAIDER SOLUTIONS LLC**

FIELD ENGINEERING | CUSTOMER SOLUTIONS | INDUSTRIAL SYSTEMS

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VOLUME II | TECHNICAL OPERATIONS SERIES

# The Handshake Protocol

## Engineering the Shift Change at the Press

A Field Guide for Sheetfed Digital Press Operations

*The S.W.I.T.C.H. Framework.*

**SYSTEM. WORK. ISSUES. TOOLS. CALLS. HANDOFF.**

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CLASSIFICATION

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FOREWORD

# The Most Expensive Ten Minutes of the Day

There is a window in every twenty-four-hour print operation that consumes less than five percent of operator time and produces a disproportionate share of the day's errors. It is the moment one operator hands the press to another. Across the broader process industry, studies of plant incidents have repeatedly found that roughly forty percent of incidents trace back to communication failures during shift handover. Print is not exempt from this pattern. Print operations are subject to the same physics of human attention, fatigue, and information transfer that govern every continuous-process manufacturing line.

The handshake is leveraged time. Done well, it compresses eight or twelve hours of operational context into ten minutes of structured exchange and the next shift starts sharp. Done poorly, it creates ghost faults that the next operator cannot diagnose because they were never told the fault existed in the first place.

Volume II of this series is dedicated to that ten-minute window. It introduces the S.W.I.T.C.H. framework, a structured handshake protocol developed by Shnaider Solutions for sheetfed digital press operations. The framework is designed to be memorized, posted at the workstation, and executed in under ten minutes without information loss.

> **OPERATING PRINCIPLE**
> A handshake is not a conversation. A conversation has no defined boundary. A handshake has a defined sequence, a defined outcome, and a defined point at which responsibility legally and operationally transfers from one operator to the next. Treat it as the contract that it is.

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**RELATIONSHIP TO VOLUME I**

Volume I established the A.M.E.N. Protocol and walked the production day through six operational phases. Phase Five was the shift handshake. Volume II expands that phase into a full framework. A reader can use this volume independently, or read it as the deep treatment of one critical phase from the broader operating system.

SECTION 01

# The Cost of an Unstructured Handshake

Across the process industries, three numbers tell the story of why structured handshakes exist. They are drawn from petrochemical, manufacturing, and continuous-process operations research, and they apply directly to the digital press floor.

**40%**
of plant incidents trace to shift handover communication failures, across continuous-process operations.

**<5%**
of operator time is spent on the handshake itself, despite its outsized contribution to incident rates.

**15%**
potential efficiency improvement reported when handshakes are standardized into a structured protocol.

These figures come from analyses outside the print industry, from petrochemical operations and from manufacturing continuous-process studies. The reason they apply to print is not coincidence. The mechanism is shared. Any operation where one human transfers responsibility for a complex system to another human, under time pressure, with imperfect documentation, is subject to the same failure mode.

On a digital press, the cost manifests differently than it does in a refinery. Instead of a safety incident, the press produces a misregistered run, a color drift that goes uncaught for two hundred sheets, a substrate jam during a job whose behavior had been flagged by the previous operator but never communicated, or a consumable that runs out at minute forty of a sixty-minute job because the prior shift did not transfer its status. The currency of the cost is different. The root cause is identical.

**WHY THIS WINDOW IS UNIQUELY DANGEROUS**
The outgoing operator is fatigued, mentally already off shift, and motivated to leave. The incoming operator is cold, has not yet formed a model of the day, and is motivated to accept what they are told without challenging it. This is exactly the wrong cognitive pairing for high-stakes information transfer. Structure is what compensates for the human state.

SECTION 02

# Why Print Inherits the Plant-Wide Pattern

Structured handover protocols did not originate in the print industry. The most developed framework, SBAR (Situation, Background, Assessment, Recommendation), was developed on US Navy nuclear submarines and adapted for medicine in the early two-thousands. It is now standard practice across hospitals worldwide. Aviation has its own handoff structures. Petrochemical operations use control-room shift turnover logs that have been refined over decades. The pattern is universal: high-stakes, continuous-process operations all converge on the same conclusion. Communication at transition points must be structured, or it fails.

Print operations have historically lacked this level of structure. Most print floors rely on a verbal walkaround and a logbook. The walkaround is unstructured. The logbook is inconsistent. Critical information depends on whether the outgoing operator remembers to mention it. This is the exact failure mode that the petro-chemical and medical industries identified and engineered out of their operations.

### What Makes Print Operations Structurally Similar

| Dimension | Petrochemical / Medical | Sheetfed Digital Press |
|---|---|---|
| **Continuous Operation** | 24/7 process control. The system never fully stops between shifts. | Long jobs span shifts. The press is mid-cycle when one operator leaves and another arrives. |
| **Multi-Variable State** | Pressures, temperatures, flow rates, alarms, set points. | Substrate conditions, ink levels, calibration state, queue depth, active alerts, environmental readings. |
| **Time Pressure at Transition** | Outgoing crew is fatigued; incoming crew is cold to current state. | Outgoing operator wants to leave; incoming operator has not yet formed a mental model of the day. |
| **Cost of Miscommunication** | Safety incident, environmental release, equipment damage. | Quality defects, customer rejection, unplanned downtime, missed delivery deadlines. |
| **Recovery Cost** | Hours to days, depending on severity. | Minutes to hours per incident, accumulated over many incidents per year. |

**THE TRANSFER OF METHOD**

Borrowing structure from another industry is not imitation. It is recognition that the underlying problem is identical. The print floor benefits from forty years of communication research conducted in operations where the cost of failure was measured in lives. The least the print industry can do is adopt the lessons.

SECTION 03

# The S.W.I.T.C.H. Framework

S.W.I.T.C.H. is the structured handshake framework developed by Shnaider Solutions for sheetfed digital press operations. It consists of six components, executed in order, by both the outgoing and incoming operator together. Each letter corresponds to one domain of operational state. The framework is designed to fit inside a ten-minute window, to be memorized, and to be executed without referring to documentation in the moment, although documentation is produced as a byproduct.

The order is deliberate. System state is established first because every other domain depends on it. Work in progress is second because that is the immediate production context. Issues come third because issues are interpreted relative to current work. Tools, calls, and final handoff confirmation follow in sequence.

## S

### SYSTEM STATE

- Press operating mode: ready, printing, idle, standby, fault.
- Active alerts on the control system. Acknowledged or pending.
- Calibration status. Last calibration time. Drift observed since.
- Environmental readings: room temperature, humidity, anomalies.

## W

### WORK IN PROGRESS

- Current job: name, customer, substrate, length remaining.
- Queue depth: approved jobs ahead, sequenced order, substrate map.
- Print quality observations on current job. Sample status.
- Any in-flight color match or proof approval pending.

## I

### ISSUES AND OPEN ITEMS

- Faults observed during the shift. Resolved or open.
- Recurring symptoms. Pattern over the shift.
- Postponed maintenance items deferred to a later window.
- Anomalies that did not trigger a fault but are worth watching.

## T

### TOOLS, SUBSTRATES, CONSUMABLES

- Substrate inventory at the press: pile and drawers, definitions confirmed.
- Consumable levels: ink, imaging, blanket, impression sheets, cleaning fluids.
- Items expected to deplete during the next shift. Replenishment plan.
- Tools or spare parts removed, used, or relocated during the shift.

## C

### CALLS, BYPASSES, WORKAROUNDS

- Open service calls. Vendor reference numbers. Expected response time.
- Active bypasses: what is bypassed, why, since when, removal target.
- Workarounds in use that deviate from standard operating procedure.
- Parts ordered or expected. Delivery status.

## H

### HANDOFF CONFIRMED

- Both operators have walked the queue together at the press.
- Both operators have walked the logbook together.
- Incoming operator can articulate the state of the press in their own words.
- Outgoing operator signs the handshake. Incoming operator countersigns.

**THE READBACK PRINCIPLE**

Borrowed from aviation and from medical handover practice. Information is not considered transferred until the receiver has stated it back to the sender in their own words. The outgoing operator does not finish the handshake by saying "any questions?" The incoming operator finishes the handshake by summarizing what they now know. This is non-negotiable.

**WHY SIX COMPONENTS, NOT FOUR OR EIGHT**

Four components are too few to capture the full state of a digital press. Eight or more exceeds the working-memory capacity of a fatigued operator. Six is the engineered compromise: enough granularity to be complete, few enough to be memorized and executed under time pressure.

SECTION 04

# S | System State

System state is the foundation of the handshake. Every subsequent component is interpreted in light of this one. Without a clear understanding of where the press is in its operating cycle, the rest of the conversation is unanchored.

### The Four Sub-Domains of System State

| Sub-Domain | What is Transferred | Why It Matters |
|---|---|---|
| **Operating Mode** | Current state: ready, printing, idle, standby, fault, or transitioning. | Determines what the incoming operator can do in the next sixty seconds. |
| **Active Alerts** | Every notification on the control system. Acknowledged or pending. Bypassed or honored. | Bypassed alerts are debt. They do not vanish at handshake. They transfer. |
| **Calibration Status** | When was the last calibration. What did it show. Has drift been observed. | Print quality decisions in the next shift depend on this baseline. |
| **Environment** | Press room temperature and humidity readings. Any anomalies during the shift. | Substrate behavior, ink behavior, and electrostatic conditions all derive from environmental state. |

### Sample Phrasing

*"Press is in printing mode, currently on job seven of nine in the queue. Two alerts active: one substrate-misfeed warning that has been acknowledged twice and is intermittent, one humidity warning that cleared an hour ago. Last calibration was at start of shift, no drift observed. Room is at twenty-two degrees and forty-eight percent humidity, both nominal."*

**WHAT THIS SECTION REPLACES**

The phrase "press is fine" is not a system state report. It is a vacuum of information shaped like a sentence. The S component of the handshake exists to replace that phrase with structured signal.

SECTION 05

# W | Work in Progress

Work in progress establishes the production context. The incoming operator needs to know what is currently running, what is approved and ready, and what is in the approval pipeline. They also need to know how the work has been behaving, not just that it exists.

### Components of the Work Transfer

- Current job identification: job name, customer, substrate type, expected length, time remaining.
- Print quality observations on the current job. Any sampling done. Any deviations seen.
- Queue depth and composition: number of approved jobs, total runtime, substrate sequence.
- Substrates loaded and where: pile content, drawer content, definitions confirmed.
- Pending approvals: jobs in the proof or color-match stage that have not yet been approved.
- Floor manager priority overrides communicated during the shift, if any.

### The Substrate Map

The substrate map is the single most error-prone element of the work transfer. The incoming operator must know exactly what substrate is in each loading position and must verify the system definitions match the physical material. A substrate definition mismatch is one of the most common preventable defects in digital print and is also one of the most expensive when it goes uncaught.

| Position | Substrate Identification | System Definition Confirmed |
|---|---|---|
| **Pile** | Type, weight, finish, size, lot number if available. | Operator confirms the material physically present matches the active substrate definition in the control system. |
| **Drawer 1** | Type, weight, finish, size. | Same confirmation required. |
| **Drawer 2** | Type, weight, finish, size. | Same confirmation required. |
| **Cleaner Page Drawer** | Identification of which drawer holds the cleaner page. | Cleaner page must be enabled in at least one drawer position with no bypass. |

**THE WALKAROUND IS NOT OPTIONAL**

Both operators must physically walk to the press together and confirm the substrate map. Verbal confirmation alone fails too often. The act of standing at the feeder and pointing at the material is the control.

SECTION 06

# I | Issues and Open Items

The Issues component is where the most knowledge is transferred and the most is typically lost. Operators tend to underreport this category for two reasons: they want to seem competent and they want to leave on time. Both motivations work against the next shift. The framework treats issues as engineering data, not as a confession of difficulty.

### Categories of Issues to Transfer

| Category | Definition | Required Detail |
|---|---|---|
| **Resolved Faults** | Fault occurred during the shift, was diagnosed, and was corrected. | What occurred, what was done, whether the fix is permanent or provisional. |
| **Open Faults** | Fault occurred and has not been resolved at handshake. | Symptom, frequency, conditions that trigger it, mitigations in place. |
| **Recurring Symptoms** | Patterns observed during the shift that may indicate a developing fault. | Frequency over the shift, conditions associated, severity trend. |
| **Postponed Maintenance** | Maintenance items deferred from daily, weekly, or monthly cadence. | What was postponed, why, scheduled completion target. |
| **Anomalies Without Fault** | Observations that did not trigger a fault but are operationally meaningful. | Description, when first observed, current status. |

**THE TWO-INSTANCE RULE**
If the same symptom occurred twice during a shift, even if both were minor and both self-resolved, it is a transfer-required item. Once is an event. Twice is a pattern. Patterns predict failures.

### The Logbook as a Forcing Function

The logbook is the artifact that makes the Issues transfer durable. Verbal handover alone is insufficient because the next shift will not remember half of it. The logbook captures what was said, who said it, and what was acknowledged. The incoming operator should read the logbook entries from the outgoing shift in front of the outgoing operator and ask questions before that operator leaves.

SECTION 07

# T | Tools, Substrates, and Consumables

The Tools component covers everything physically present at the workstation that affects the next shift's ability to operate. It is structurally similar to a logistics handover. Three sub-domains: substrate inventory, consumable status, and physical tools and parts.

## Substrate Inventory at the Press

- Quantities currently loaded in the pile and each drawer.
- Quantities staged at the workstation but not yet loaded.
- Quantities expected to deplete during the next shift, by job.
- Substrate warehouse status: where the next replenishment comes from, lead time if remote.

## Consumable Status

| Consumable | Current Status | Trigger for Replacement |
|---|---|---|
| **Ink (each color)** | Quantity remaining, recent consumption rate. | Threshold based on planned queue and historical usage rate. |
| **Imaging Cylinder Consumable** | Hours or impressions on current unit. Wear indicators. | Approaching defined replacement counter. |
| **Blanket-Related Consumable** | Hours or impressions on current unit. Print quality status. | Approaching defined replacement counter or PQ degradation. |
| **Impression Sheets** | Quantity remaining at the press. | Daily replacement cadence regardless of remaining count. |
| **Cleaning Fluids and Wipes** | Quantity at the workstation. | Operator restock when below working threshold. |

## Physical Tools and Parts

Anything removed from its standard location during the shift, used, relocated, or sent out for service must be transferred. The cabinet inventory at start of shift should match the cabinet inventory at end of shift unless explicitly noted in the handshake.

> **ANTICIPATE, DO NOT REACT**
> The purpose of the T component is not to report current state alone. It is to project forward. The handshake should answer the question: what is going to run out or wear out during the incoming shift, and what should the operator do about it.

SECTION 08

# C | Calls, Bypasses, and Workarounds

The Calls component captures everything that represents an open commitment between the press and someone outside it. Service calls, parts orders, vendor escalations, and active bypasses all live in this domain. These items are particularly prone to being lost at handshake because they exist outside the press itself, in email threads or phone records, and the next operator cannot see them without being told.

## Open Service Calls

- Reference number assigned by the vendor.
- Date and time the call was opened.
- Symptom or issue that triggered the call.
- Last vendor response and expected next contact.
- Mitigations in place while waiting for service.

## Active Bypasses

A bypass is a deliberate suppression of a system protection or alert in order to continue production. Every bypass is a debt. Every debt has a deadline. The framework requires that every active bypass be transferred with full context.

| Field | Required Information |
|---|---|
| **What is bypassed** | Specific component, sensor, alert, or protection. |
| **Why it was bypassed** | The original symptom that triggered the bypass and the production decision behind it. |
| **When it was bypassed** | Date and time of the bypass action. |
| **By whom** | Operator who applied the bypass and shift manager who authorized it, if applicable. |
| **Removal target** | When the bypass will be reviewed for removal. The maximum acceptable duration before escalation. |
| **Risk during bypass** | What protection is lost. What conditions could cause harm during the bypass period. |

**BYPASSES COMPOUND**

A single bypass is a managed risk. Three bypasses on the same press are a system operating outside its design envelope. The handshake is the only point at which the total bypass count across shifts is visible. If the count is climbing, the framework is the early warning.

SECTION 09

# H | Handoff Confirmation

The final component is not information transfer. It is verification that information transfer occurred. This step is what separates a handshake from a monologue. Without explicit confirmation, the outgoing operator has no evidence that anything was received, and the incoming operator has no obligation to act on what they were told.

### The Three Verifications

| Verification | Method | Outcome |
|---|---|---|
| **Queue Walk** | Both operators stand at the press. Outgoing operator points at each job in the queue and identifies the substrate. Incoming operator confirms. | Both operators agree on what the press will produce in the next sixty minutes. |
| **Logbook Walk** | Both operators read the logbook entries together. Incoming operator asks clarifying questions on every entry from the prior shift. | Every adjustment, fix, bypass, parts replacement, open call, workaround, and postponed task is acknowledged in person. |
| **Readback** | Incoming operator summarizes the state of the press in their own words. Outgoing operator corrects or confirms. | Information transfer is verified by the receiver, not by the sender. |

### Sign-Off

After the three verifications are complete, both operators sign the logbook entry for the handshake. The signature is not symbolic. It is the operational equivalent of a chain of custody. From the moment of countersignature, responsibility for the press transfers. Anything not communicated before signature is a defect introduced into the next shift, and the framework treats it as such.

> **THE STOP-AND-CONFIRM RULE**
> If at any point during the handshake the incoming operator is uncertain, the handshake stops. The press does not transfer. The shift manager is brought in, or additional time is taken. Pressing on with an incomplete transfer is a guaranteed production loss in the first hour of the new shift.

SECTION 10

# The Ten-Minute Window: Choreography

S.W.I.T.C.H. is designed to fit inside a ten-minute window. The discipline is to keep moving through the components without skipping and without lingering. The outgoing operator drives the conversation. The incoming operator asks questions, performs the readback at the end, and signs.

| Minute | Activity | Lead |
|---|---|---|
| **00 to 01** | Press is brought to a stop. Both operators move to the workstation. Logbook is open. | Outgoing |
| **01 to 02** | S \| System State. Operating mode, alerts, calibration, environment. | Outgoing reports, incoming acknowledges. |
| **02 to 04** | W \| Work in Progress. Walk to the press. Substrate map confirmed at the feeder. Queue walked through. | Both at the press. |
| **04 to 06** | I \| Issues. Logbook is read together. Open and resolved items discussed. | Both at the workstation. |
| **06 to 07** | T \| Tools, Substrates, Consumables. Inventory and projection. | Outgoing reports. |
| **07 to 08** | C \| Calls and Bypasses. Open service calls, active bypasses, workarounds. | Outgoing reports, incoming asks questions. |
| **08 to 09** | H \| Readback. Incoming operator summarizes the state in their own words. | Incoming. |
| **09 to 10** | Sign-off. Both operators sign the logbook. Press is released to incoming operator. | Both. |

**WHEN TEN MINUTES IS NOT ENOUGH**

Some shifts produce more state to transfer than others. A shift that experienced a major fault, multiple bypasses, or a substrate quality investigation will not fit into ten minutes. The protocol allows for extended handshakes when warranted. What it does not allow is a compressed handshake that skips components to fit the clock. If the conversation needs fifteen minutes, take fifteen minutes.

SECTION 11

# Common Failure Modes at Handshake

Every print operation that runs multiple shifts develops the same set of handshake failure modes. Recognizing them by name is the first step to engineering them out. The table below catalogs the patterns observed across multi-site field engagements.

| Failure Mode | Typical Symptom | S.W.I.T.C.H. Component That Prevents It |
|---|---|---|
| **The Verbal Drive-By** | "Press is fine, queue is loaded, see you tomorrow." No substance transferred. | S, W, and I components force structured content. The framework refuses to be drive-by. |
| **The Substrate Mismatch** | Incoming operator runs the next job on the wrong substrate because the drawer was changed but the system definition was not. | W component requires both operators to physically confirm each substrate position at the feeder. |
| **The Hidden Bypass** | A protection was bypassed during the prior shift. Fault recurs during the next shift and is treated as a new fault. | C component requires every bypass to be named with full context, including removal target. |
| **The Lost Service Call** | A vendor call was opened but no one tells the incoming operator. The vendor calls back during the next shift and the operator has no context. | C component captures every open call by reference number. |
| **The Pattern That Was Once** | A symptom occurred twice during the prior shift. The outgoing operator dismisses it as random. The same symptom causes a fault in the next shift. | I component plus the two-instance rule. Twice is a pattern. |
| **The Silent Postponement** | A maintenance item was deferred. No one says so. It is overdue by the time the next shift identifies it. | I component requires postponed maintenance to be transferred with target completion date. |
| **The Unverified Readback** | The handshake ends without the incoming operator articulating what they now know. | H component is a hard requirement. No readback, no transfer. |
| **The Unsigned Handshake** | The shift change happens without anyone signing the logbook. | H component requires countersignature before responsibility transfers. |

APPENDIX A

# The Handshake Worksheet

The worksheet below is a printable single-page reference that may be filled out during the handshake itself, kept as a logbook supplement, or adapted into a digital form. It tracks every component of the S.W.I.T.C.H. framework with a sign-off block at the bottom. Sites are free to reproduce it for internal use.

| Press ID | Date | Outgoing Operator | Incoming Operator |
|---|---|---|---|
| | | | |

| Component | Items Transferred | Initials |
|---|---|---|
| **S \| System State** | Operating mode:_____ Alerts active:_____<br>Calibration:_____ Environment:_____ | Out:_____<br>In:_____ |
| **W \| Work in Progress** | Current job:_____ Queue depth:_____<br>Substrate map confirmed at feeder: Yes / No | Out:_____<br>In:_____ |
| **I \| Issues and Open Items** | Open faults:_____<br>Recurring symptoms:_____<br>Postponed maintenance:_____ | Out:_____<br>In:_____ |
| **T \| Tools and Consumables** | Substrates loaded:_____<br>Consumable status:_____<br>Items expected to deplete:_____ | Out:_____<br>In:_____ |
| **C \| Calls and Bypasses** | Open service calls:_____<br>Active bypasses:_____<br>Workarounds:_____ | Out:_____<br>In:_____ |
| **H \| Handoff Confirmed** | Queue walked together: Yes / No<br>Logbook walked together: Yes / No<br>Readback completed: Yes / No | Out:_____<br>In:_____ |

| Outgoing Operator Signature | Incoming Operator Signature | Time of Handoff |
|---|---|---|
| | | |

**ON THE WORKSHEET**

The worksheet is not the protocol. The conversation is the protocol. The worksheet is the artifact that proves the conversation took place. Filling out the worksheet without holding the conversation is paper compliance, not operational discipline.

CLOSING NOTE

# The Handshake as Strategic Asset

Most shops view the handshake as a routine. The framework presented in this volume treats it as a strategic asset. Sites that implement structured handshakes compound operational knowledge across shifts and across years. Sites that do not, repeat the same faults, rediscover the same workarounds, and order the same parts twice.

S.W.I.T.C.H. is the Shnaider Solutions handshake protocol. It is engineered for the sheetfed digital press environment, but the underlying logic transfers to any continuous-process operation where one human transfers responsibility for a complex system to another. The vocabulary changes. The discipline does not.

Volume III of the Technical Operations Series will address what happens when the handshake reveals a problem the outgoing shift could not solve: the structured diagnostic protocol. Until then, the handshake itself is the highest-leverage improvement available on most print floors. It costs nothing to implement. It compounds for the life of the operation.

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