

紡織與成衣製造業的數位轉型

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講者簡介

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  科技管理碩士
- 產品：Skill-Math（自主開發）

  Signal Bit 迷你型企業資源規劃系統（自主開發）

  Centric 產品生命週期管理系統（印尼合作夥伴）

  Coats Digital（印尼合作夥伴）

  Coupa Software（印尼合作夥伴）
- 經歷：GSD 標準工時系統實務專家、系統解決方案業務開發人員，曾為多家主要成衣製造商提供生產力顧問服務，並擔任多項系統導入專案的發起人或專案經理。



產業背景

時尚產業（紡織、成衣與鞋類）的獨特發展歷程：

第一代：僅以少量機臺起家。

第二代：承接並擴大事業，認為提升生產力就是增加機臺與人力。

第三代：開始需要系統化管理，但第一代與第二代通常仍參與決策。

機臺與人力屬於有形資源；系統與軟體屬於無形資產，因此其價值常被低估。


人工作業
自動化作業



- 數位轉型 = 提升效率與生產力
- 數位轉型 = 讓工作與生活更便利
- 數位轉型 = 改變思考與工作方式

數位化面臨的挑戰

1. **第一階段：系統評選**
   - 管理階層希望自行開發系統
   - 管理階層以最低價格為優先考量
   - 內部人員抗拒變革
   - 對落差分析的理解不足

2. **第二階段：系統導入**
   - 系統導入藍圖不夠詳盡、完整，專案執行期間經常追加工作範圍
   - 專案團隊凝聚力不足，負責人缺乏帶領系統導入的能力
   - 執行人員須同時維持人工流程與系統作業，增加工作負擔

數位化面臨的挑戰

3. **第三階段：導入後的使用與管理**
    - 使用者缺乏作業紀律，容易回到原有工作方式
    - 管理階層對系統缺乏關注

日常生產問題

- 產量未達目標
- 物料延遲到貨，影響生產排程
- 製程瓶頸造成生產壅塞
- 加班過於頻繁
- 產品品質不穩定
- 產能調度困難
- 生產效率偏低
- 作業員缺勤
- 其他問題.....



人力

機臺

物料

作業方法



人員

機臺

原物料

作業方法

Skill Math

From Skill Measurement to Factory Excellence

從技能量測 邁向卓越工廠管理





PT. YUTAMA KREASINDO

"improvement in productivity, efficiency & competitiveness"

www.skill-math.com

Skill Math

作業員
技能矩陣

- 作業員技能分級
- 國際標準落差分析
- 產線平衡
與產線配置
- 人力規劃

機臺資產管理

- 維修技師技能矩陣與
績效指標
- 備品庫存管理
- 維護成本控管

Matcha-ai



銷售訂單管理

- 銷售訂單轉生產工單
- 產能規劃與獲利預估
- 基本成本核算與物料
清單管理

生產執行與監控

- 作業員、工作站與製
程配對
- 生產規劃與進度監控
- 擷取並記錄產量

Matcha-ai

Unique AI From Skill Math

Skill-Math 的獨特人工智慧技術

- 產線平衡
- 人力需求計算
- 生產規劃與監控
- 機臺資產管理
- 備品庫存管理
- 報表與分析



工業工程



- 辨識並減少製程瓶頸
- 優化產線配置與效率

生產規劃



- 提升生產力
- 訂單管理
- 產能規劃

生產管理



- 提升效率
- 降低風險與延誤

維修技師



- 智慧作業與管理
- 提升工作績效

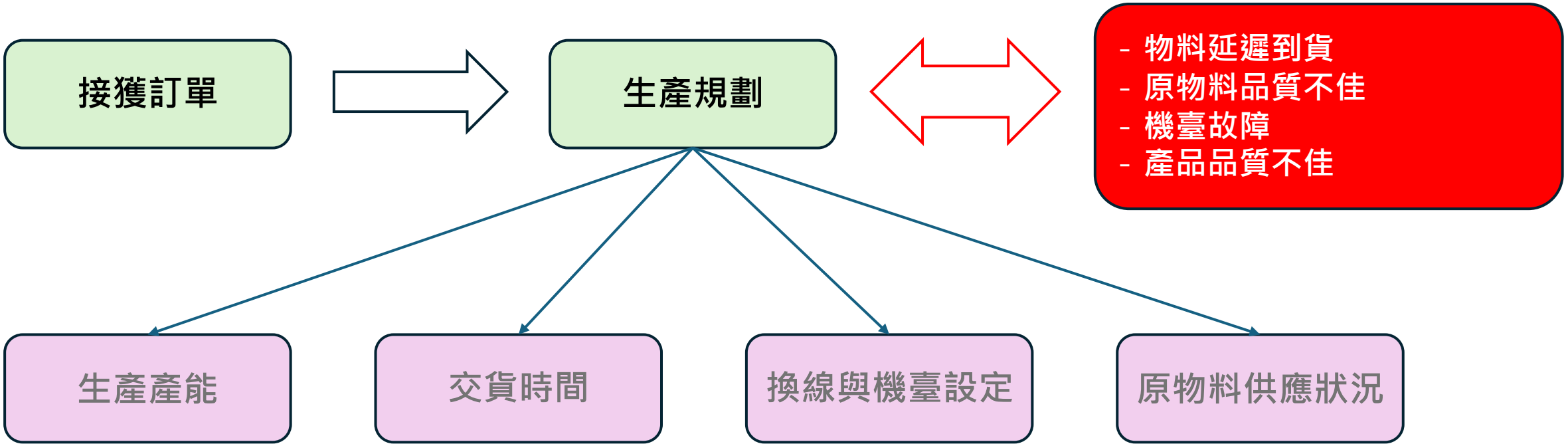
經營管理



透過人工智慧
建議改善決策

生產規劃的重要性

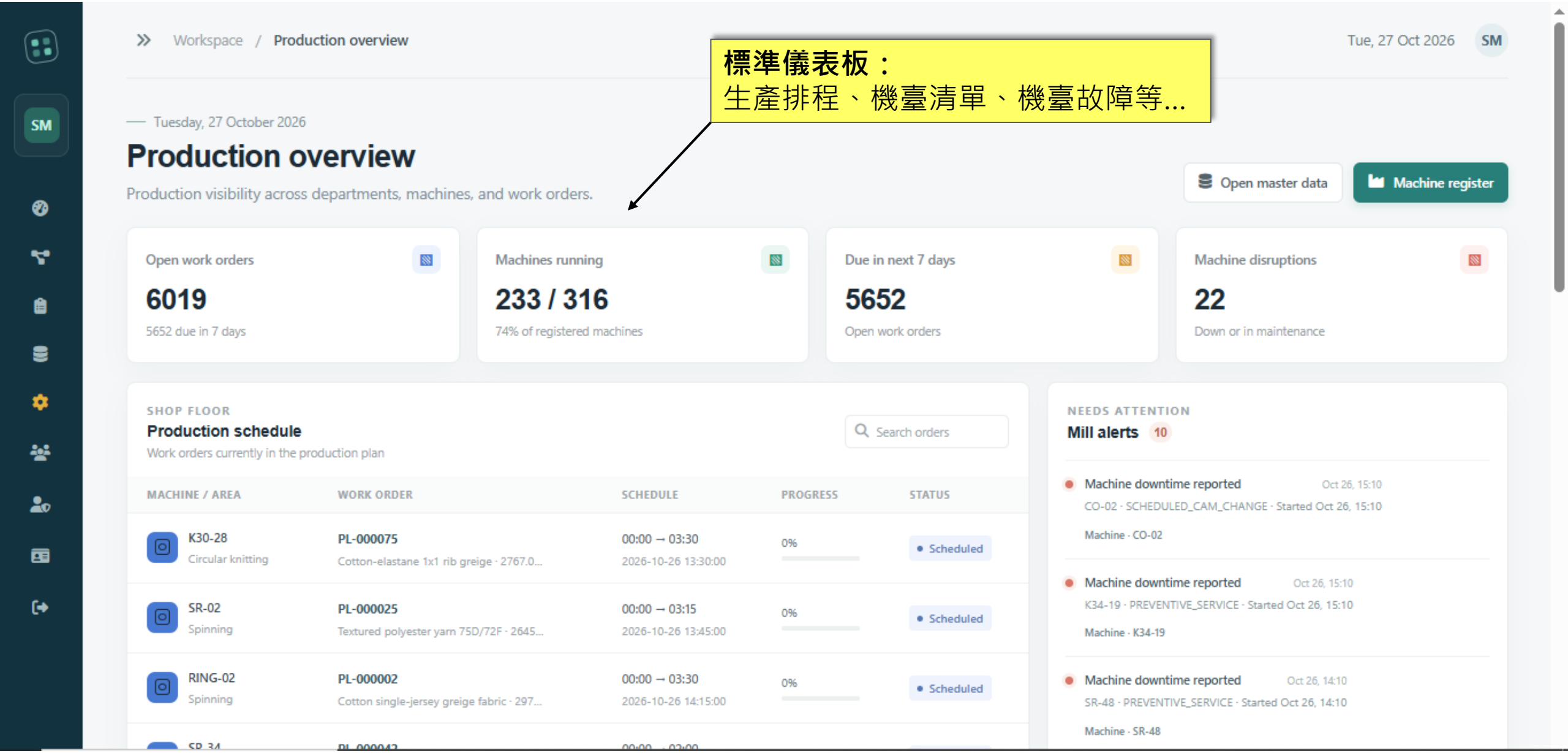
沒有人計畫失敗，但許多人因規劃不周而失敗



Skill-Math 解決方案簡報

SkillMath

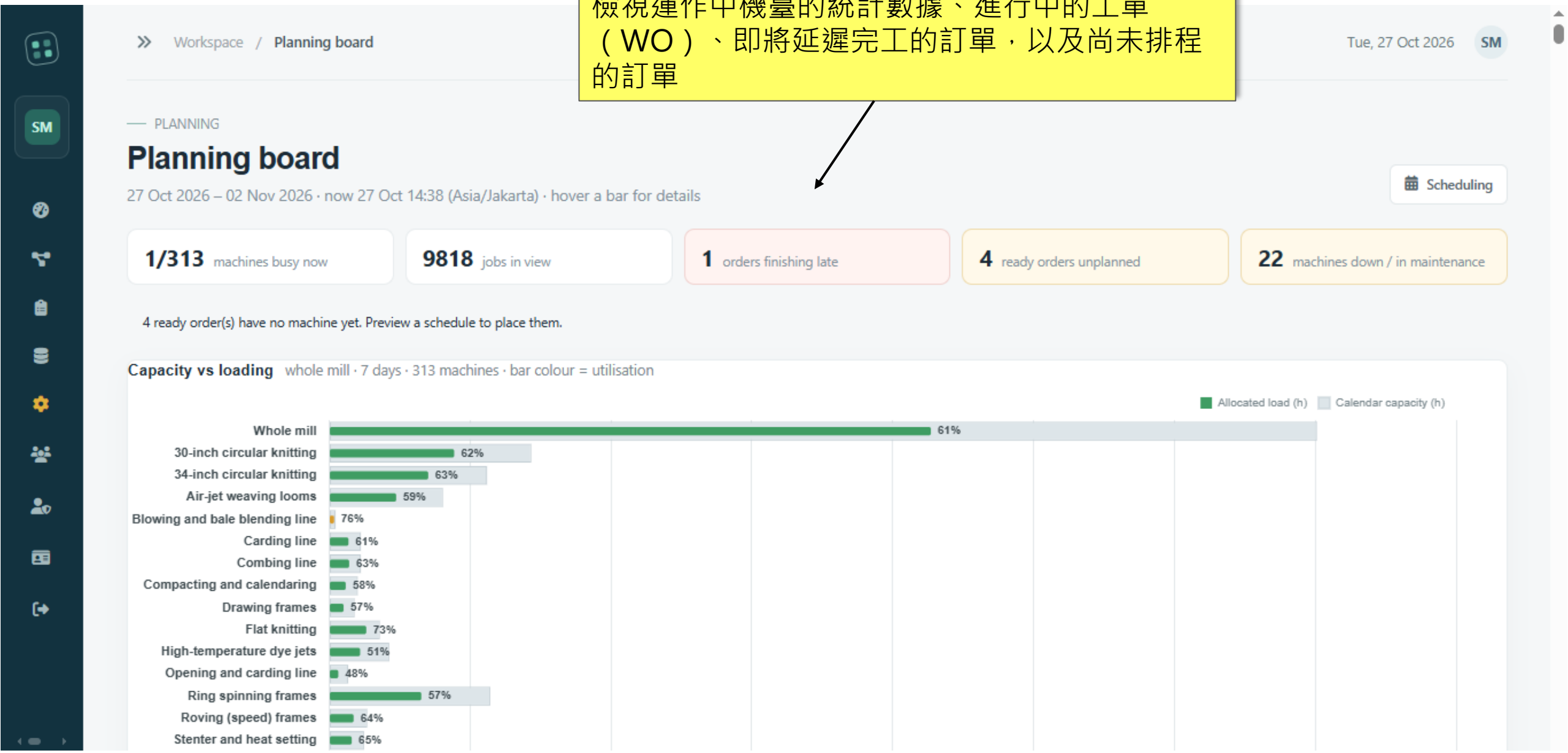
SkillMath 紡織業解決方案


Workspace / Production overview
Tue, 27 Oct 2026
SM
標準儀表板：
生產排程、機臺清單、機臺故障等...
Tuesday, 27 October 2026
Production overview
Production visibility across departments, machines, and work orders.
Open master data
Machine register
Open work orders
6019
5652 due in 7 days
Machines running
233 / 316
74% of registered machines
Due in next 7 days
5652
Open work orders
Machine disruptions
22
Down or in maintenance
SHOP FLOOR
Production schedule
Work orders currently in the production plan
Search orders
MACHINE / AREA
WORK ORDER
SCHEDULE
PROGRESS
STATUS
K30-28
Circular knitting
PL-000075
Cotton-elastane 1x1 rib greige · 2767.0...
00:00 → 03:30
2026-10-26 13:30:00
0%
Scheduled
SR-02
Spinning
PL-000025
Textured polyester yarn 75D/72F · 2645...
00:00 → 03:15
2026-10-26 13:45:00
0%
Scheduled
RING-02
Spinning
PL-000002
Cotton single-jersey greige fabric · 297...
00:00 → 03:30
2026-10-26 14:15:00
0%
Scheduled
NEEDS ATTENTION
Mill alerts
10
Machine downtime reported
Oct 26, 15:10
CO-02 · SCHEDULED_CAM_CHANGE · Started Oct 26, 15:10
Machine · CO-02
Machine downtime reported
Oct 26, 15:10
K34-19 · PREVENTIVE_SERVICE · Started Oct 26, 15:10
Machine · K34-19
Machine downtime reported
Oct 26, 14:10
SR-48 · PREVENTIVE_SERVICE · Started Oct 26, 14:10
Machine · SR-48

產能規劃：
檢視工廠需求與可用工時的對比。
並可依指定時間範圍，查看總機臺數中的可用機臺數及運作狀態。



規劃看板：
檢視運作中機臺的統計數據、進行中的工單（WO）、即將延遲完工的訂單，以及尚未排程的訂單



PLANNING

Planning board

27 Oct 2026 – 02 Nov 2026 · now 27 Oct 14:38 (Asia/Jakarta) · hover a bar for details

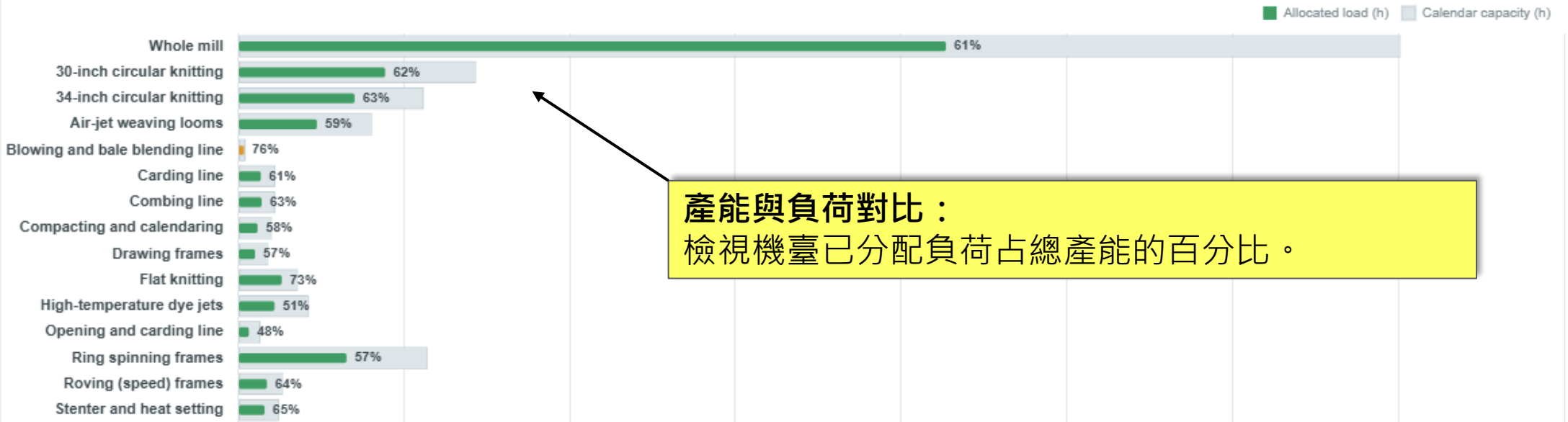
Scheduling

1/313 machines busy now	**9818** jobs in view	**1** orders finishing late	**4** ready orders unplanned	**22** machines down / in maintenance

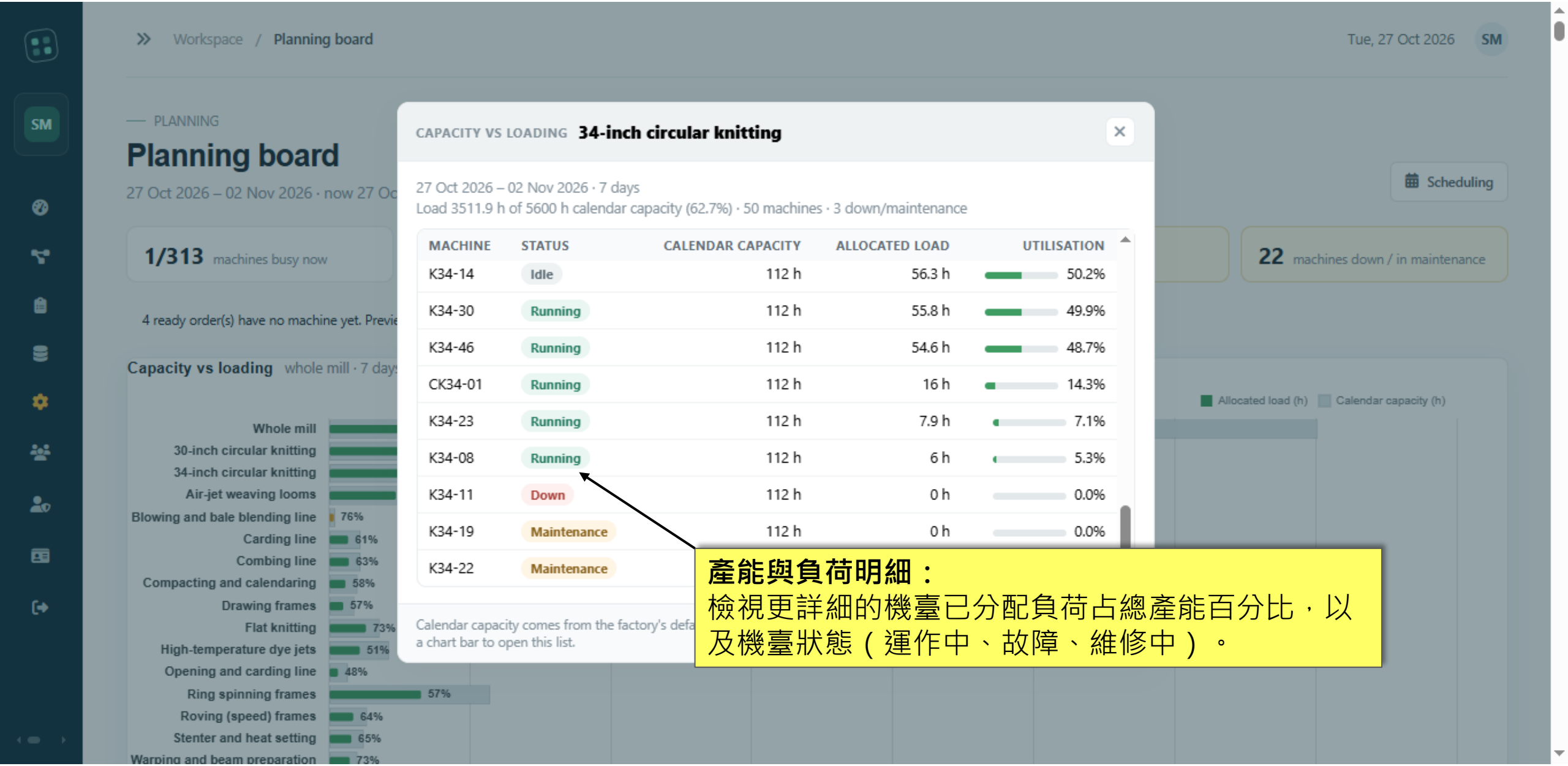
4 ready order(s) have no machine yet. Preview a schedule to place them.

Capacity vs loading

whole mill · 7 days · 313 machines · bar colour = utilisation

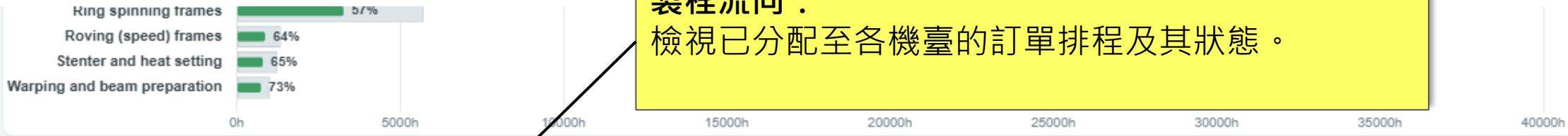


產能與負荷對比：
檢視機臺已分配負荷占總產能的百分比。



產能與負荷明細：
檢視更詳細的機臺已分配負荷占總產能百分比，以及機臺狀態（運作中、故障、維修中）。

製程流向：
檢視已分配至各機臺的訂單排程及其狀態。



Process flow | Timeline

Machine group: All groups | Show

In progress | Scheduled | Proposed | Finishes after due date | Overlap

2 Spinning — 51 machines

Machine No	Schedule	Order No
RING-01	26 Oct 2026	PL-000001
	26 Oct 2026	PL-000206
	26 Oct 2026	PL-000387
	26 Oct 2026	PL-000500
	26 Oct 2026	PL-000748
	26 Oct 2026 – 27 Oct 2026	PL-000960
	27 Oct 2026	PL-001064
	27 Oct 2026	PL-001324
	27 Oct 2026	PL-001522
	27 Oct 2026	PL-001583
	27 Oct 2026	PL-001786
	27 Oct 2026	PL-001904
	27 Oct 2026 – 28 Oct 2026	PL-002059
	28 Oct 2026	PL-002077
	28 Oct 2026	PL-002360
	28 Oct 2026	PL-002434

3 Weaving — 45 machines

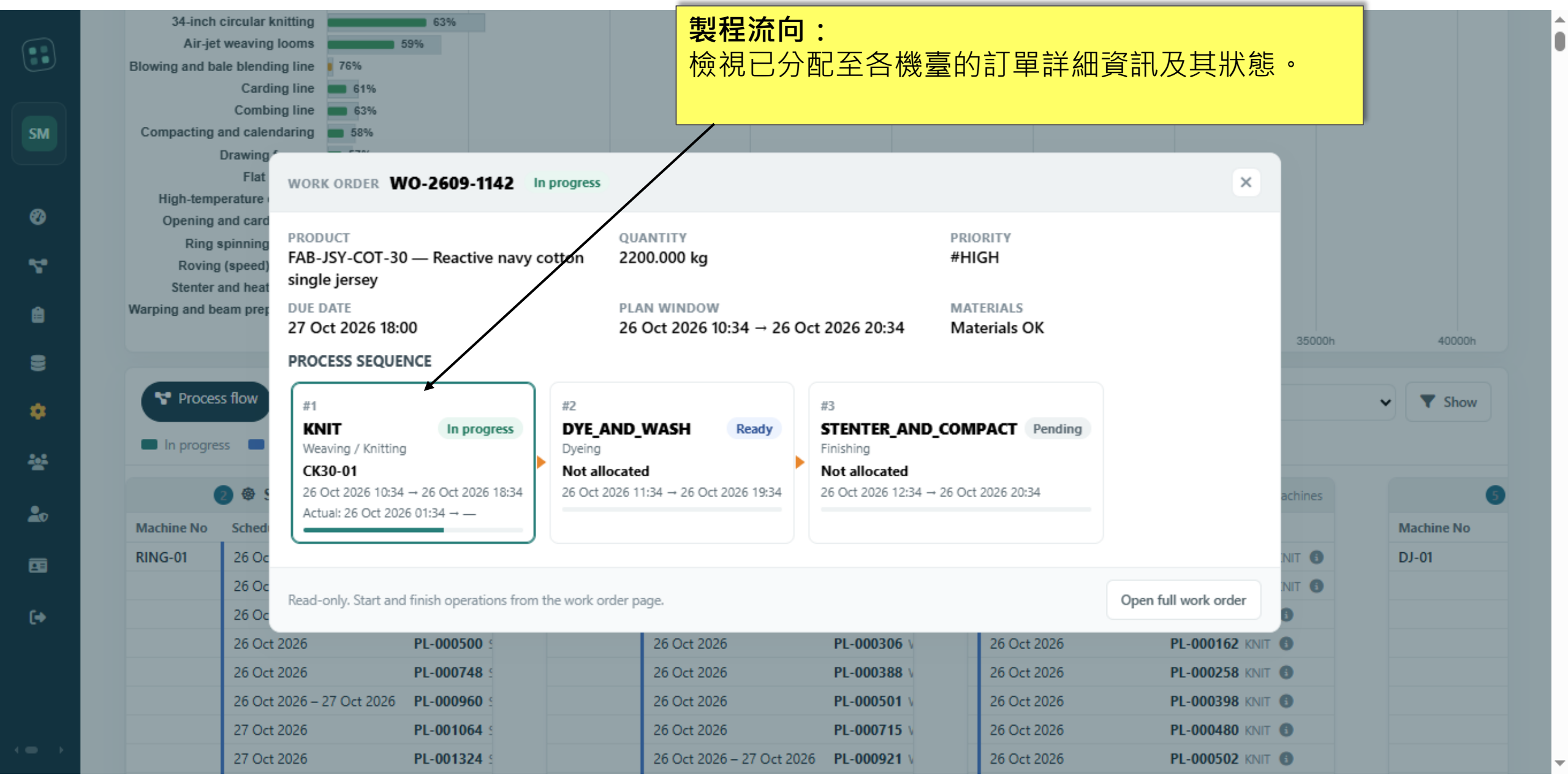
Machine No	Schedule	Order No
AJ-01	28 Oct 2026	WO-2609-11
AJ-02	26 Oct 2026	PL-000002
	26 Oct 2026	PL-000176
	26 Oct 2026	PL-000306
	26 Oct 2026	PL-000388
	26 Oct 2026	PL-000501
	26 Oct 2026	PL-000715
	26 Oct 2026 – 27 Oct 2026	PL-000921
	27 Oct 2026	PL-001065
	27 Oct 2026	PL-001325
	27 Oct 2026	PL-001452
	27 Oct 2026	PL-001540
	27 Oct 2026	PL-001584
	27 Oct 2026	PL-001786
	27 Oct 2026	PL-001873
	27 Oct 2026 – 28 Oct 2026	PL-001959

4 Knitting — 130 machines

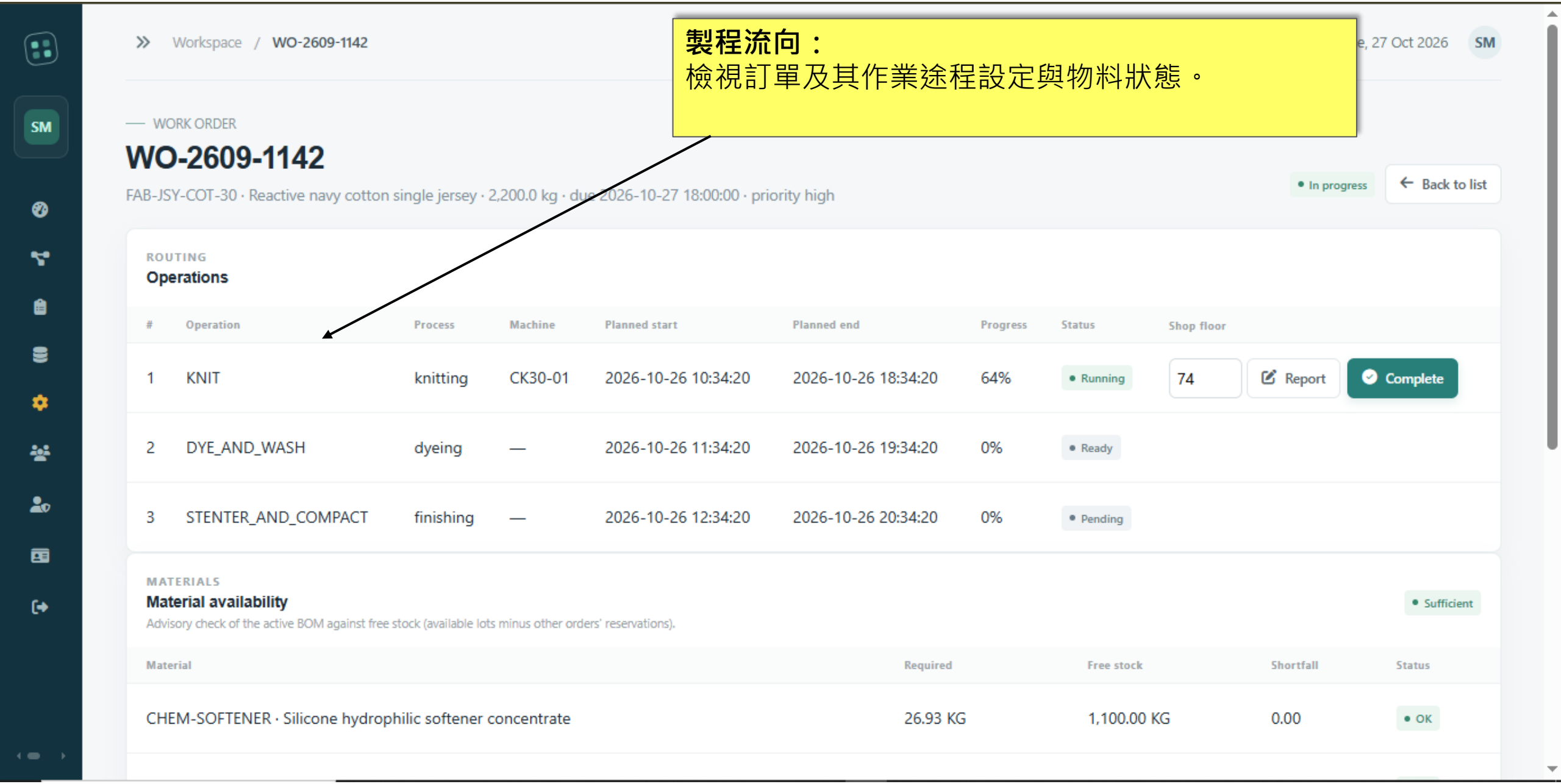
Machine No	Schedule	Order No
CK30-01	26 Oct 2026	WO-2609-
	28 Oct 2026	WO-2609-
CK30-02	26 Oct 2026	PL-000003
	26 Oct 2026	PL-000162
	26 Oct 2026	PL-000258
	26 Oct 2026	PL-000398
	26 Oct 2026	PL-000480
	26 Oct 2026	PL-000502
	26 Oct 2026	PL-000682
	26 Oct 2026	PL-000854
	26 Oct 2026 – 27 Oct 2026	PL-000961
	27 Oct 2026	PL-001067
	27 Oct 2026	PL-001291
	27 Oct 2026	PL-001489
	27 Oct 2026	PL-001584
	27 Oct 2026	PL-001808

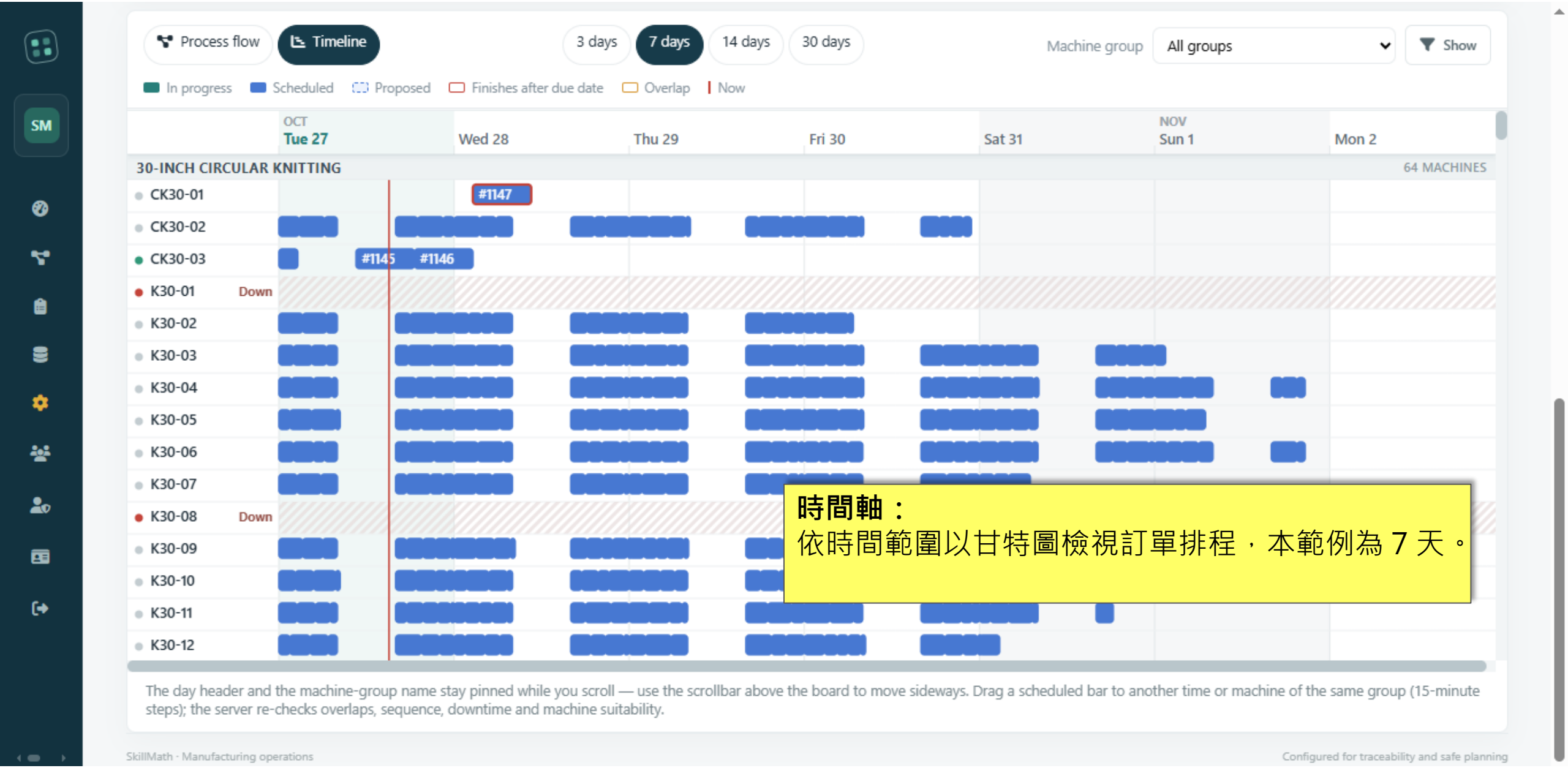
5

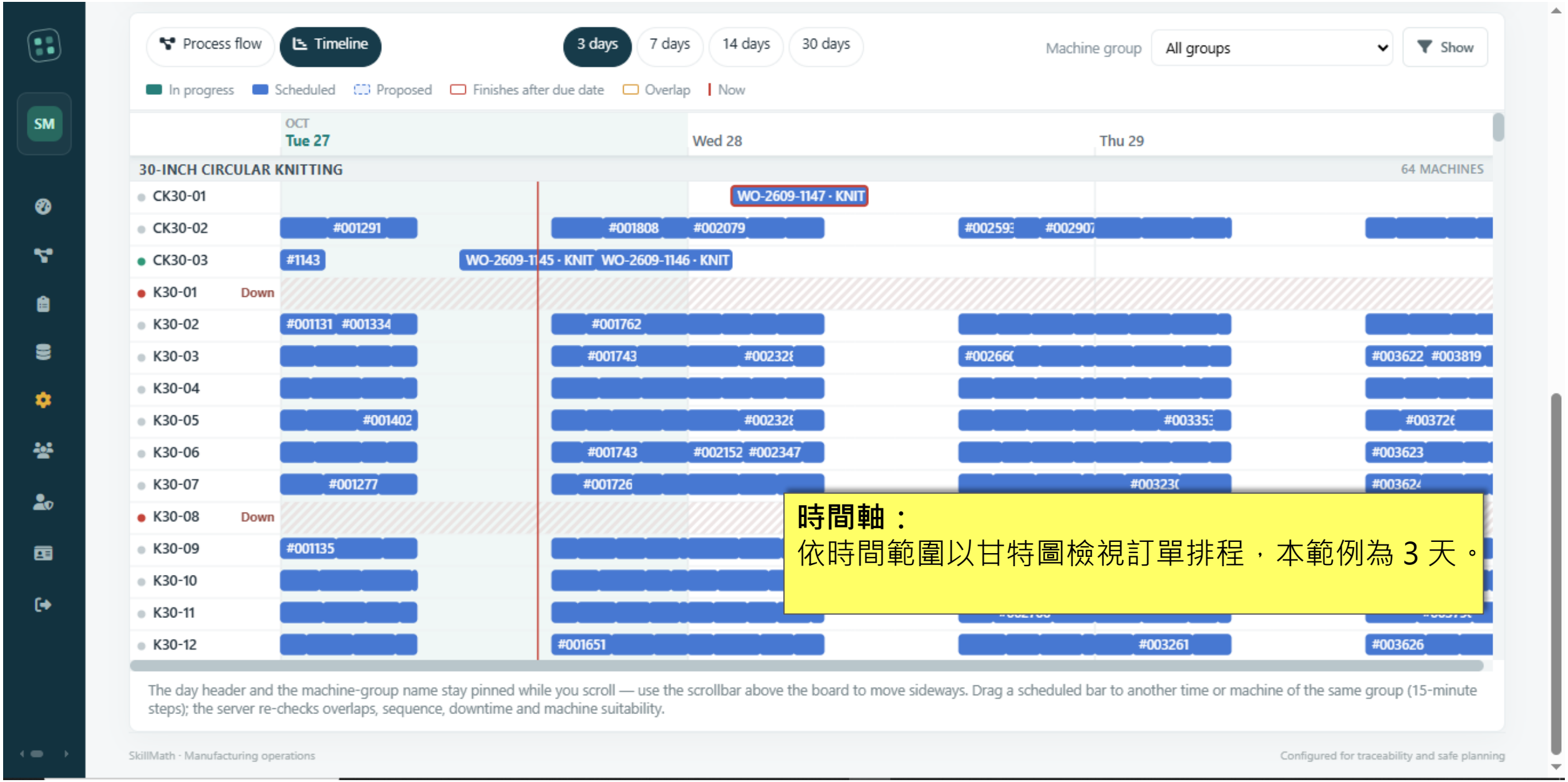
Machine No
DJ-01

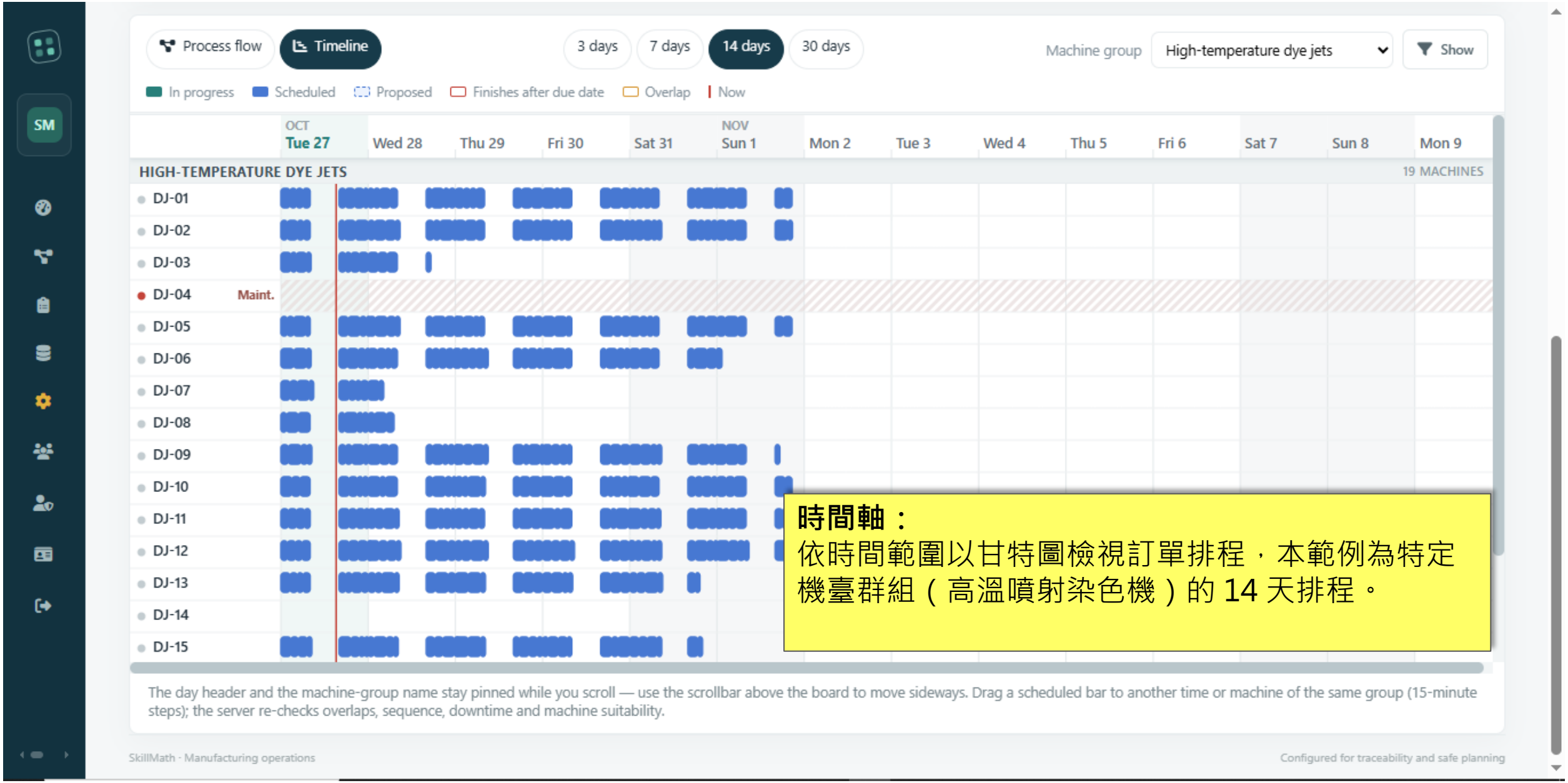

製程流向：
檢視已分配至各機臺的訂單詳細資訊及其狀態。
WORK ORDER WO-2609-1142 In progress
PRODUCT
FAB-JSY-COT-30 — Reactive navy cotton single jersey
QUANTITY
2200.000 kg
PRIORITY
#HIGH
DUE DATE
27 Oct 2026 18:00
PLAN WINDOW
26 Oct 2026 10:34 → 26 Oct 2026 20:34
MATERIALS
Materials OK
PROCESS SEQUENCE
#1
KNIT
In progress
Weaving / Knitting
CK30-01
26 Oct 2026 10:34 → 26 Oct 2026 18:34
Actual: 26 Oct 2026 01:34 → —
#2
DYE_AND_WASH
Ready
Dyeing
Not allocated
26 Oct 2026 11:34 → 26 Oct 2026 19:34
#3
STENTER_AND_COMPACT
Pending
Finishing
Not allocated
26 Oct 2026 12:34 → 26 Oct 2026 20:34
Read-only. Start and finish operations from the work order page.
Open full work order
34-inch circular knitting 63%
Air-jet weaving looms 59%
Blowing and bale blending line 76%
Carding line 61%
Combing line 63%
Compacting and calendaring 58%
Process flow
Show
Machine No
RING-01
DJ-01
PL-000500
PL-000748
PL-000960
PL-001064
PL-001324
PL-000306
PL-000388
PL-000501
PL-000715
PL-000921
PL-000162
PL-000258
PL-000398
PL-000480
PL-000502

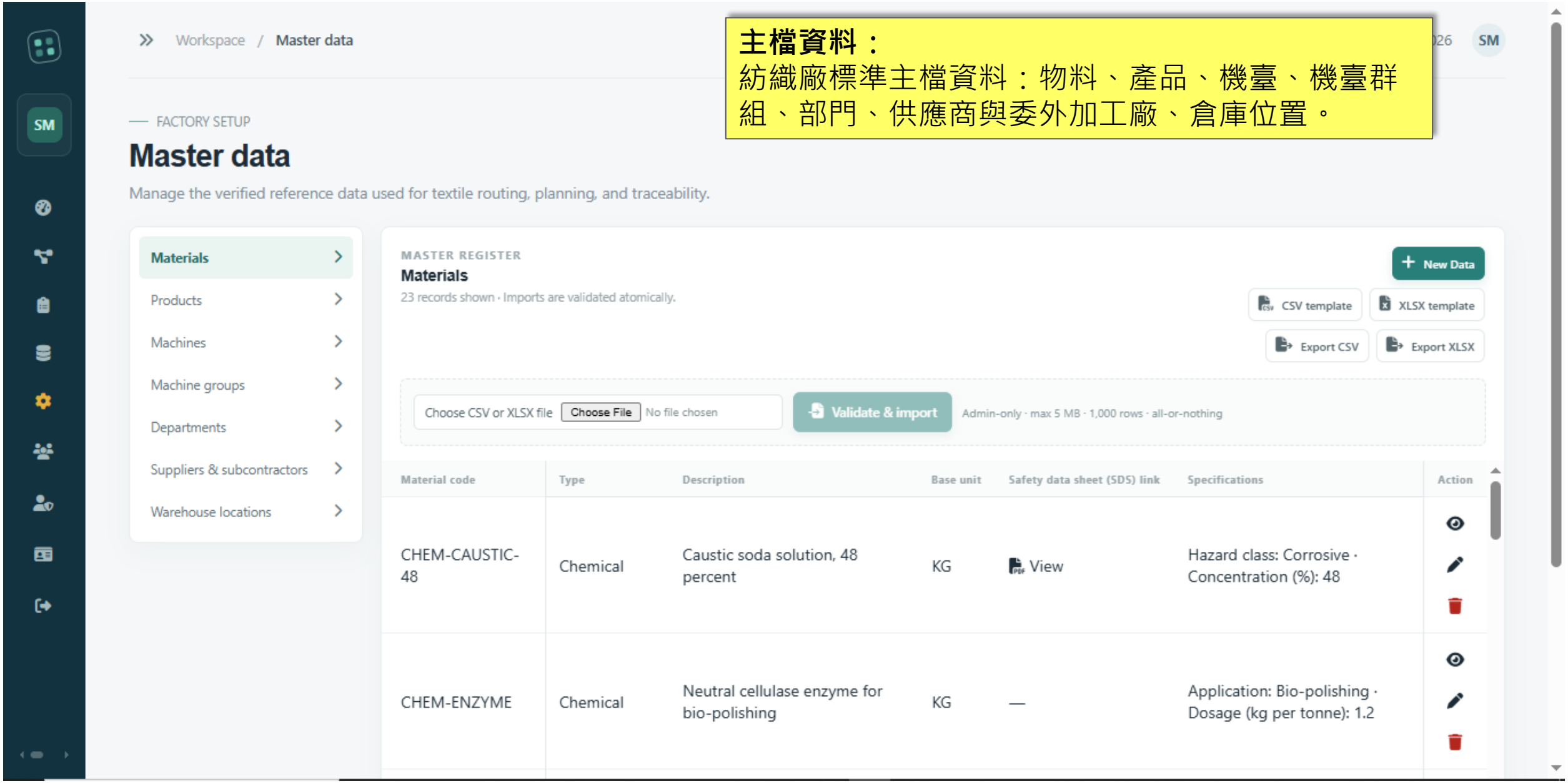
製程流向：
檢視訂單及其作業途程設定與物料狀態。




Process flow
Timeline
3 days
7 days
14 days
30 days
Machine group
All groups
Show
In progress
Scheduled
Proposed
Finishes after due date
Overlap
Now
OCT
Tue 27
Wed 28
Thu 29
Fri 30
Sat 31
NOV
Sun 1
Mon 2
30-INCH CIRCULAR KNITTING
64 MACHINES
CK30-01
CK30-02
CK30-03
K30-01 Down
K30-02
K30-03
K30-04
K30-05
K30-06
K30-07
K30-08 Down
K30-09
K30-10
K30-11
K30-12
#1147
#1145
#1146
時間軸：
依時間範圍以甘特圖檢視訂單排程，本範例為 7 天。
The day header and the machine-group name stay pinned while you scroll — use the scrollbar above the board to move sideways. Drag a scheduled bar to another time or machine of the same group (15-minute steps); the server re-checks overlaps, sequence, downtime and machine suitability.
SkillMath · Manufacturing operations
Configured for traceability and safe planning


Process flow
Timeline
3 days
7 days
14 days
30 days
Machine group
All groups
Show
In progress
Scheduled
Proposed
Finishes after due date
Overlap
Now
OCT
Tue 27
Wed 28
Thu 29
30-INCH CIRCULAR KNITTING
64 MACHINES
CK30-01
CK30-02
CK30-03
K30-01 Down
K30-02
K30-03
K30-04
K30-05
K30-06
K30-07
K30-08 Down
K30-09
K30-10
K30-11
K30-12
WO-2609-1147 · KNIT
#001291
#001808
#002079
#1143
WO-2609-1145 · KNIT
WO-2609-1146 · KNIT
#001131
#001334
#001762
#001743
#001402
#001277
#001726
#001135
#001651
#003261
#003622
#003819
#003623
#003626
時間軸：
依時間範圍以甘特圖檢視訂單排程，本範例為 3 天。
The day header and the machine-group name stay pinned while you scroll — use the scrollbar above the board to move sideways. Drag a scheduled bar to another time or machine of the same group (15-minute steps); the server re-checks overlaps, sequence, downtime and machine suitability.
SkillMath · Manufacturing operations
Configured for traceability and safe planning


Process flow
Timeline
3 days
7 days
14 days
30 days
Machine group
High-temperature dye jets
Show
In progress
Scheduled
Proposed
Finishes after due date
Overlap
Now
OCT
Tue 27
Wed 28
Thu 29
Fri 30
Sat 31
NOV
Sun 1
Mon 2
Tue 3
Wed 4
Thu 5
Fri 6
Sat 7
Sun 8
Mon 9
HIGH-TEMPERATURE DYE JETS
19 MACHINES
DJ-01
DJ-02
DJ-03
DJ-04
Maint.
DJ-05
DJ-06
DJ-07
DJ-08
DJ-09
DJ-10
DJ-11
DJ-12
DJ-13
DJ-14
DJ-15
時間軸：
依時間範圍以甘特圖檢視訂單排程，本範例為特定機臺群組（高溫噴射染色機）的 14 天排程。
The day header and the machine-group name stay pinned while you scroll — use the scrollbar above the board to move sideways. Drag a scheduled bar to another time or machine of the same group (15-minute steps); the server re-checks overlaps, sequence, downtime and machine suitability.
SkillMath · Manufacturing operations
Configured for traceability and safe planning


主檔資料：
紡織廠標準主檔資料：物料、產品、機臺、機臺群組、部門、供應商與委外加工廠、倉庫位置。
Workspace / Master data
SM
FACTORY SETUP
Master data
Manage the verified reference data used for textile routing, planning, and traceability.
Materials
Products
Machines
Machine groups
Departments
Suppliers & subcontractors
Warehouse locations
MASTER REGISTER
Materials
23 records shown · Imports are validated atomically.
New Data
CSV template
XLSX template
Export CSV
Export XLSX
Choose CSV or XLSX file
Choose File
No file chosen
Validate & import
Admin-only · max 5 MB · 1,000 rows · all-or-nothing
Material code
Type
Description
Base unit
Safety data sheet (SDS) link
Specifications
Action
CHEM-CAUSTIC-48
Chemical
Caustic soda solution, 48 percent
KG
View
Hazard class: Corrosive · Concentration (%): 48
CHEM-ENZYME
Chemical
Neutral cellulase enzyme for bio-polishing
KG
—
Application: Bio-polishing · Dosage (kg per tonne): 1.2