GROUP PACKET 4

The seventh x-ray machine

Agenda 4 of 6

For one group of four to six people

1 rules card
dark blue, for the group

1 agenda card
dark blue, for the group

5 role cards
one per person

HOW TO HAND IT OUT

1. Give each person one role card. Read only your own.
2. Put the rules card and the agenda card in the middle of the table.
3. The role named on the agenda card opens the meeting.
4. Six people? Two share the operator card. Four people? One person takes both the controller and the executive card.

HAND BACK AFTER THE DEBRIEF

The agenda card, with your answers and your group's sentence. Keep the role cards if you like.

ROLE 2 OF 5

Data Scientist

You joined from outside manufacturing. You have the data. You do not yet have a working model.

WHAT YOU KNOW

The line generates over 52 million data points a day. You have found around 40 datasets that might predict board quality. Solder paste shape, position and volume look promising.

WHAT YOU ARE PROTECTING

The right to work without a defined target, because in your field the target is discovered rather than specified.

YOUR OPENING POSITION

Give the work six months and real access to the process experts. A guarantee is not available, and asking for one misunderstands the method.

YOUR WEAK SPOT · KEEP IT PRIVATE

You need operators to collect data that has no immediate benefit to them, and they have already refused once.

ASK SOMEONE IN YOUR GROUP

Ask the quality manager what level of accuracy would be good enough. Watch how long the answer takes.

ROLE-PLAY · OPERATING MODELS

THE SEVENTH X-RAY MACHINE

Keep your card to yourself
until the debrief.

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FOR THE WHOLE GROUP

How this works

TIME

Ten minutes in role. Then the debrief, where groups report by agenda.

READ ONLY YOUR OWN CARD

The weak spots are private. Do not compare cards until the debrief.

YOU ARE AT THE DECISION POINT

Production has risen and the plant needs a seventh x-ray machine. You do not know how any of this turned out. Nothing after this moment is available to you.

WHAT YOU MUST LEAVE WITH

One sentence the whole group can state: a recommendation, or a plain statement of what you could not settle. Write it, and your agenda answer, on the agenda card.

STAY IN ROLE

Do not break character to be reasonable. The disagreement is the point of the exercise.

IN THE DEBRIEF

In the debrief you will be asked which role was hardest to argue, and why.

AGENDA 4 OF 6 · FOR THE WHOLE GROUP

Should the data scientist work on the shop floor, inside the plant?

OPENS THE MEETING

The data scientist

One minute on this question. Then the others answer in turn.

1 · DECIDE

☐ **Yes** ☐ **No** If no, where?

2 · THE STRONGEST ARGUMENTS

For your answer

Against it

3 · YOUR GROUP'S SENTENCE

Fund the seventh machine, refuse it, or something else?

Hand this card in after the debrief.

FOR THE WHOLE GROUP

THE SEVENTH X-RAY MACHINE

Keep this card in the middle of the table.

FOR THE WHOLE GROUP

THE SEVENTH X-RAY MACHINE

Keep this card in the middle of the table.

ROLE 1 OF 5

Shop Floor Operator

You run the x-ray station. Fifteen years on this line. In practice you are the one who decides when a board looks wrong enough to hold.

WHAT YOU KNOW

The x-ray step is slow and you have said so for years. You also know your eye has caught things the cameras missed. Nobody has ever explained a machine learning model to you.

WHAT YOU ARE PROTECTING

Your judgement about which boards need testing, and the part of your job that consists of exercising it.

YOUR OPENING POSITION

If nobody can tell you how a prediction was reached, you cannot stand behind it when a customer complains.

YOUR WEAK SPOT · KEEP IT PRIVATE

You have complained about x-ray batching breaking the flow for years. You are on record. Somebody will use that.

ASK SOMEONE IN YOUR GROUP

Ask the data scientist what happens the first time the model is wrong, and who explains it to the customer.

ROLE 3 OF 5

Quality Manager

You own the defect rate. When a customer's production line stops, the call comes to you first.

WHAT YOU KNOW

Eleven defects per million. Ninety-nine per cent traceability from supplier to customer. Any decision on the line can be traced to a workstation in two clicks. Some customers pay specifically for x-ray certification.

WHAT YOU ARE PROTECTING

A number that took decades to reach, and the traceability that lets you defend it to anyone who asks.

YOUR OPENING POSITION

Reducing testing is the wrong direction. A system you cannot audit is a system you cannot defend.

YOUR WEAK SPOT · KEEP IT PRIVATE

The inspection step you are defending creates work in process inventory, and disrupting the flow is itself a source of quality risk.

ASK SOMEONE IN YOUR GROUP

Ask the executive whether they will sign the letter to the customer if a board the model passed fails in the field.

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ROLE 4 OF 5

Financial Controller

You approve the capital request. Nothing gets bought without your signature.

WHAT YOU KNOW

Roughly 500,000 euro for the machine. It also brings an x-ray officer, regulatory compliance, plant wide training, maintenance and staffing. The plant ships about a million products a month on a 24 hour lead time, so a stalled line is expensive.

WHAT YOU ARE PROTECTING

Capital discipline, and a forecast you can defend at the end of the year.

YOUR OPENING POSITION

A machine is a known cost with a known outcome. A model is an unknown cost with an unknown outcome. Show me the point at which the model pays.

YOUR WEAK SPOT · KEEP IT PRIVATE

You have no way to price the option of not buying the seventh machine, and then not buying the eighth.

ASK SOMEONE IN YOUR GROUP

Ask the data scientist for the cheapest experiment that would tell you whether this works at all.

ROLE 5 OF 5

Division Executive

You sponsor the plant's technology agenda. You have latitude that nobody else in this room has.

WHAT YOU KNOW

Amberg is treated as a lighthouse plant and other sites watch what happens here. A visible failure costs you in ways that never appear in a capital budget. You can withhold funding without giving a full reason.

WHAT YOU ARE PROTECTING

The plant's standing, and the possibility of doing something other than buying a seventh machine and then an eighth.

YOUR OPENING POSITION

Buying the machine is the routine decision. Routine decisions are how a plant this good stops improving.

YOUR WEAK SPOT · KEEP IT PRIVATE

Production is rising now. If you refuse and the line backs up next quarter, your name is on it.

ASK SOMEONE IN YOUR GROUP

Ask the group what they would need to see in six months to change their minds. Write the answer down.

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