

MANUFACTURING INSIGHTS

Value Stream Mapping

SCENE 1.
CG: FBI warning
white text centered on black to
blue gradient

WARNING

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SCENE 2. GBMP LOGO plus text:
Greater Boston Manufacturing
Partnership

PRODUCED IN PARTNERSHIP WITH GBMP

SCENE 3.
tape 40, 01:00:00-01:00:12
SME logo, with music

SME LOGO ANIMATION

SCENE 4.
MI graphic inside box.

MUSIC UP AND UNDER

NARRATION (VO) :

MANUFACTURING INSIGHTS, MANUFACTURING ENGINEERING
MAGAZINE'S VIDEO SERIES FOR PROCESS IMPROVEMENT.

SCENE 5.
people mapping in classroom
VSM6 00.03.12 - 00.03.22

THIS PROGRAM WILL EXPLAIN HOW VALUE STREAM
MAPPING, ALSO CALLED MATERIAL AND INFORMATION FLOW

Building stoves, no people
VSM12 02.32.52 - 02.33.06

DIAGRAMMING, IS BEING USED TO IMPROVE THE

Exterior of building
VSM12 02.49.35 - 02.50.09

MANUFACTURING OF GAS FIRED STOVES AT JOTUL NORTH
AMERICA IN GORHAM, MAINE.

SCENE 6.
ws of class room
VSM5 00.11.22 to 00.11.32

Team watching mfg
VSM2 00.01.49 - 00.02.02

DURING A TWO DAY TRAINING EVENT, EMPLOYEES AT JOTUL NORTH AMERICA EXAMINED AND DOCUMENTED THE PROCESS FOR PRODUCING THEIR WORLD FAMOUS STOVES TO SYSTEMATICALLY IDENTIFY UNEVENNESS, DELAYS AND CORRECTION LOOPS IN BOTH MATERIAL AND INFORMATION FLOW.

SCENE 7. Bins of parts,
paperwork, angle name on boards
showing scheduling
VSM9 00.24.17 - 00.24.32

THEN, USING THE STANDARD VALUE STREAM MAPPING SYMBOLOGY, THEY ENVISIONED AND DEPICTED AN IMPROVED FLOW OF MATERIAL AND INFORMATION FOR THE STOVE LINE BASED UPON LEAN COUNTERMEASURES.

SCENE 8.
VSM9 00.45.04 - 00.45.22

8b. VSM3 00.43.23 - 00.43.34

THE TEAM OF EMPLOYEES DOCUMENTED THE CURRENT MATERIAL FLOW ON THE SHOP FLOOR AS WELL AS THE FLOW OF INFORMATION THAT CONTROLS THE PRODUCTION OPERATION. IN DOING SO, THEY UNCOVERED OPPORTUNITIES TO IMPROVE QUALITY, COST, LEAD-TIME AND CUSTOMER VALUE.

SCENE 9.
Shot of pat talking in classroom
vsm5 00.21.19 to 00.21.32

THE VALUE STREAM MAPPING EFFORT WAS LED BY PAT WARDWELL, SENIOR CONTINUOUS IMPROVEMENT MANAGER FOR GREATER BOSTON MANUFACTURING PARTNERSHIP.

SCENE 10.
group of people at a map, cut to
drawings of mapping symbols
VSM5 00.32.28 to 00.32.42

PAT'S ROLE WAS TO HELP JOTUL BUILD A SYNERGISTIC TEAM. AS FACILITATOR AND MOTIVATOR SHE HELPED THEM TO "SEE" AND THEN COMMUNICATE IMPROVEMENT OPPORTUNITIES, USING THE SYMBOLS AND TERMS OF VALUE STREAM MAPPING AS THEY CREATED CURRENT AND TARGET CONDITION VALUE STREAM MAPS.

SCENE 11.
Scott and team talking on the
plant floor
VSM11 01.44.34 - 01.44.50

IN THE NEXT FEW MONTHS, THE TEAM WILL WORK WITH
OTHERS IN THE COMPANY ON THE OPPORTUNITIES
DISCOVERED THROUGH THIS TYPICAL VALUE STREAM
MAPPING EXERCISE.

SCENE 12.
manufacturing, scrap, movement
VSM4 00.10.05 - 00.10.22

TO BEGIN, PAT REMINDED PARTICIPANTS THAT
CONTINUOUS IMPROVEMENT IS FOR EVERY EMPLOYEE. SHE
EXPLAINED HOW THE VALUE STREAM MAPPING TOOL
ENABLES THEM TO MAP CURRENT AND TARGET CONDITIONS
ENCOURAGING THEM TO SHARE THEIR KNOWLEDGE OF
PROBLEMS AND THEIR CREATIVITY FOR IMPROVEMENT.

SCENE 13.
VSM6 00.00.11 - 00.00.31

PAT OUTLINED HOW THE TOOL OF VALUE STREAM MAPPING
WOULD ALLOW THEM TO STEP BACK AND EXAMINE THE
OVERALL FLOW OF MATERIAL AND INFORMATION. THEY
WOULD DISCOVER JUST HOW WELL VALUE IS FLOWING
ACCORDING TO CUSTOMER REQUIREMENTS. MOREOVER, SHE
STRESSED THAT IT ACCOMPLISHES THIS BY ENGAGING AND
SHARING THE THINKING OF EVERY SINGLE EMPLOYEE
INVOLVED IN THE VALUE STREAM.

VSM 6 00.12.13 - 00.12.27

SCENE 14.
Large inventory
VSM3 00.25.03 - 00.25.20

THEN THE TEAM WAS REMINDED ABOUT THE DEFINITION OF
WASTE IN A PROCESS AND HOW THE MAP WOULD
ILLUSTRATE THE PROBLEMS THAT COME UP WHEN MATERIAL
AND INFORMATION ARE NOT FLOWING.

SCENE 15.

Drawing map in classroom

VSM6 00.42.42 - 00.42.50

Close up of data box on map

VSM12 02.11.45 - 02.12.11

VSM12 02.12.43 - 02.12.53

NEXT THEY LEARNED ABOUT THE VARIOUS SYMBOLS USED WITH VALUE STREAM MAPPING. IT WAS EXPLAINED THAT THE SYMBOLS REPRESENT A "COMMON LANGUAGE" FOR COMMUNICATING PROCESS FLOW AND IMPEDIMENTS TO FLOW. IN THIS SENSE, THE VALUE STREAM MAP IS A VISUAL STANDARD THAT STRENGTHENS COMPANY-WIDE UNDERSTANDING OF IMPROVEMENT OPPORTUNITIES. THE TEAM THEN STUDIED THE KEY MEASUREMENTS INCLUDED IN A MATERIAL AND INFORMATION FLOW DIAGRAM. THEY WERE INTRODUCED TO KEY DATA THAT WOULD BE NEED TO BE CAPTURED AND QUANTIFIED WITHIN THE "CURRENT STATE" MAP.

SCENE 16.

VSM11 01.07.26 - 01.07.38

VSM12 02.10.23 - 02.10.37

NEXT CAME THE "GO SEE" PHASE, WHERE THE TEAM WENT TO THE STOVE PRODUCTION, SHIPPING AND SUPPORTING AREAS TO SEE FIRST-HAND HOW MATERIAL AND INFORMATION WAS OR WAS NOT FLOWING THROUGH THE JOTUL PLANT. THIS PHASE PROVIDED THE INPUTS NECESSARY TO DRAW THE CURRENT STATE MAP. THE TEAM WAS ABLE TO CAPTURE MANY POTENTIAL IMPROVEMENT OPPORTUNITIES ALONG THE WAY.

SCENE 17.
VSM11 01.04.04 - 01.04.18
THE SHOP-FLOOR WALK-ABOUT IS CRITICAL IN A VALUE
STREAM MAPPING EXERCISE. IT IS THE KEY TO
DEVELOPING TACIT LEARNING FOR EVERYONE INVOLVED.
IN FACT, IF THE PROCESS DOES NOT INVOLVE DIRECT
OBSERVATION, THE EXERCISE WILL BE SUPERFICIAL AND
COUNTERPRODUCTIVE. SEEING THE PROCESS FIRST HAND
VSM03 00.41.14 - 00.41.35
ALLOWS THE TEAM TO UNDERSTAND ALL THE STEPS THAT
HAVE TO BE COORDINATED AND SYNCHRONIZED FOR A
CUSTOMER TO GET THE RIGHT STOVE, AT THE RIGHT
TIME, AND IN THE RIGHT QUANTITY.

SCENE 18.
Team talking in the class room
VSM9 00.20.14 - 00.20.36
classroom, Scott talking
VSM9 00.24.25 - 00.24.33
AFTER ACQUIRING A COMMON AND FACT-BASED
UNDERSTANDING OF HOW THINGS WERE HAPPENING TODAY,
THE TEAM WORKED TOGETHER TO MAKE PLANS FOR A
BETTER PROCESS. THE "TARGET CONDITION" WAS
ENVISIONED AND DEFINED USING THE VALUE STREAM
SYMBOLS.

SCENE 19.
Paul talking at end, last tape
VSM9 00.57.18 - 00.57.40
THE FINAL HOURS OF THE TRAINING SESSION FOCUSED ON
MAKING A PLAN TO ACHIEVE THE TARGET CONDITION.

SCENE 20.
Pat wardell interview
VSM12 02.08.15 - 02.08.25
Bret Watson
VSM12 02.25.42 - 02.25.52
Scott Clinch
VSM12 02.15.53 - 02.16.10
THIS VIDEO ALSO INCLUDES ADDITIONAL INSIGHTS FROM
THE EVENT FACILITATOR, PAT WARDWELL, BRET WATSON,
THE PRESIDENT OF JOTUL NORTH AMERICA AND SCOTT
CLINCH, THE MANUFACTURING MANAGER WHO WILL WORK
TOGETHER WITH HIS PEOPLE TO MAKE MANY OF THESE
PROPOSED CHANGES.

Scene 20b. Learning to See book
FOR MORE INFORMATION ON VALUE STREAM MAPPING,
CHECK OUT THE BOOK, "LEARNING TO SEE", PUBLISHED
BY THE LEAN ENTERPRISE INSTITUTE.

SCENE 21. FADE TO BLACK

SCENE 22. TODAY'S BUSINESS CLIMATE MANDATES THAT COMPANIES
End use promotional images of STAY FOCUSED ON THE CUSTOMER. SUCCESSFUL
Jotul stove in brochures. ORGANIZATIONS MAKE SURE THEIR CUSTOMERS ARE
NEED TO PROCESS THESE IMAGES TREATED AS "NUMBER 1". THEY UNDERSTAND THAT THE
Putting paperwork into packages. CUSTOMER IS THE ONE WHO SETS THE PRICE AND DECIDES
VSM12 02.36.23 - 02.36.47 WHAT THEY ARE WILLING TO PAY FOR.

SCENE 23. TO STAY AHEAD OF THE COMPETITION, A LEAN COMPANY
show painting operation MUST BE ABLE TO RESPOND QUICKLY TO BOTH INTERNAL
VSM11 01.37.57 to 01.38.15 AND EXTERNAL CUSTOMERS.

SCENE 24. EMPLOYEES AT JOTUL HAVE BEEN INVOLVED WITH
Person welding firebox CONTINUOUS IMPROVEMENT FOR SEVERAL YEARS. THEY
VSM 11 01.50.02 - 01.50.20 HAVE BUILT THOUSANDS OF STOVES AND UNDERSTAND HOW
VSM11 01.56.44 - 01.56.57 VALUE IS CREATED FROM WHAT THEY DO.

SCENE 25. HOWEVER, JOTUL EMPLOYEES RECOGNIZE THAT THEIR
Vsm03 00.49.56 to 00.50.10 PROCESSES ARE STILL FAR FROM PERFECT AND THAT
WITHIN EVERY OPERATION, THERE IS ALWAYS ROOM FOR
IMPROVEMENT.

SCENE 26. EMPLOYEES STILL SHARE SOME DISSATISFACTION WITH
VSM11 01.49.34 - 01.49.46 HOW THINGS ARE BEING DONE. THIS DISSATISFACTION IS
NORMAL AND IS A NECESSARY CONDITION TO FOSTER THE
IMPROVEMENT SPIRIT.

SCENE 27. TO BEST OBSERVE THE MANUFACTURING PROCESS FOR A
group of people watching workers STOVE, THE TEAM TOOK THE SAME JOURNEY EACH STOVE
VSM11 01.03.06 - 01.03.20 TAKES AS IT MOVES THROUGH THEIR FACILITY.

SCENE 28.
Clip boards in shipping
VSM3 00.06.58 - 00.07.20

BY DIRECTLY OBSERVING THE WORK BEING PERFORMED AND TALKING WITH THE PEOPLE DOING IT, THEY GAINED AN UNDERSTANDING OF THE ENTIRE PROCESS.

SCENE 29.
Packing stove
VSM12 02.43.05 - 02.43.35
Assem of burners

TO MOVE FROM THE CURRENT VALUE STREAM FLOW TO WHERE THE COMPANY WANTS TO BE TOMORROW, JOTUL IS PLANNING ON MAKING A SERIES OF ADJUSTMENTS TO ITS ASSEMBLY LINE AND THE PRODUCTION PLANNING PROCESS.

SCENE 30.
Moving material into cell
VSM12 02.29.11 - 02.29.57

THE JAPANESE TERM FOR THESE CHANGES IS KAIZEN, WHICH MEANS "GOOD CHANGE". EACH CHANGE WILL ELIMINATE VARIOUS TYPES OF WASTE AND MAKE JOTUL MORE PRODUCTIVE AND BETTER ABLE TO SERVE ITS CUSTOMERS.

SCENE 31.
press brake bending
VSM12 02.23.59 - 02.24.12

THE MAJORITY OF IMPROVEMENTS PLANNED DO NOT REQUIRE ADDITIONAL CAPITAL INVESTMENTS.

SCENE 32.
Assembly area
VSM12 02.31.03 - 02.31.29

IN MOST CASES, A COMPANY ALREADY HAS ALL THE MACHINES AND EQUIPMENT REQUIRED. THE ONLY THING CHANGING IS HOW THE PROCESS IS BEING DONE, TO ELIMINATE WASTE, AND MAKE MORE TIME FOR VALUE-ADDED WORK.

SCENE 33.
team talking in the classroom
VSM9 00.31.07 - 00.31.19

WHILE PLANNING FOR VALUE STREAM IMPROVEMENTS, EVERYONE SHOULD BE ENCOURAGED TO THINK OF REASONS WHY THE NEW WAY WILL WORK, NOT HOW IT WILL FAIL.

SCENE 34.
rack of parts for 35 stoves

VSM2 00.18.30 - 00.18.50

VSM11 01.30.04 - 01.30.20

ALSO, DON'T SPEND TOO MUCH TIME MAKING THE VALUE
STREAM "PERFECT" THE FIRST TIME. VALUE STREAM
MAPPING IS AN ITERATIVE PROCESS; AT SOME POINT,
TODAY'S "TARGET CONDITION" WILL BECOME TOMORROW'S
'CURRENT CONDITION'. ADDITIONALLY, THE MARKETPLACE
AND THE SHOP FLOOR ARE DYNAMIC ENVIRONMENTS, SO
IMPROVEMENT MUST BE ON-GOING.

SCENE 35.

VSM11 01.34.35 - 01.34.48

NEW VALUE STREAM WALKS AND MATERIAL AND
INFORMATION FLOW REVIEWS WILL BE NECESSARY TO
UNCOVER THE NEXT ROUND OF IMPROVEMENTS.

SCENE 36.
team talking on the plant floor
VSM9 00.00.13 to 00.00.25

VSM11 01.48.55 -
01.49.14 people working

WHEN THE TEAM IS DISCUSSING THE CURRENT CONDITION
OR POSSIBLE IMPROVEMENTS, INPUT IS NEEDED FROM
EVERYONE. DO NOT RELY ON A SINGLE INDIVIDUAL OR
COMPUTER DATA TO MAKE DECISIONS. REMEMBER, THE
PEOPLE WHO DO THE WORK ARE THERE 100% OF THE DAY
AND WILL HAVE KEY OBSERVATIONS NO ONE ELSE CAN
PROVIDE.

SCENE 37.

VSM11 01.50.02 - 01.50.20

ONCE YOU DO DECIDE TO MAKE A CHANGE, ASK "WHY"
FIVE TIMES TO GET TO THE ROOT OF THE ISSUE. THIS
WILL INSURE YOU ARE SOLVING THE CORRECT PROBLEM
FOR THE LONG TERM.

SCENE 38.

VSM11 01.36.36 - 01.36.44
38b. VSM12 02.43.06 - 02.43.11
38c. VSM3 00.11.29 - 00.11.36

WITHIN THE FACTORY YOU CAN SEE THREE DIFFERENT
TYPES OF FLOW - MATERIAL FLOW, PRODUCTION FLOW,
AND INFORMATION FLOW.

SCENE 39.
VSM2 00.14.15 - 00.14.32

SOMETIMES, MATERIAL IS AVAILABLE, BUT THE MACHINE
OR PEOPLE NEEDED TO PROCESS IT ARE NOT. OTHER
TIMES PEOPLE OR MACHINES ARE WAITING FOR PARTS OR
INFORMATION. THIS "OUT OF PHASE" CONDITION CAUSES
UNEVENNESS - PEAKS AND VALLEYS - AND INSTABILITY
IN THE PRODUCTION SEQUENCE.

39b. VSM2 00.41.08 - 00.41.18

39c. VSM2 00.21.34 - 00.21.42

SCENE 40.
VSM11 01.47.40 - 01.48.01

UNEVEN PROCESSES CAUSE CONFUSION, DELAYS AND
INEFFICIENT USE OF COMPANY RESOURCES SUCH AS
PEOPLE, EQUIPMENT AND MATERIAL.

SCENE 41. a
VSM11 01.35.34 - 01.35.45

DURING THE VALUE STREAM WALK, THE TEAM KEEPS AN
EYE OUT FOR ANY FORM OF NON-VALUE-ADDED ACTIVITY
OR WASTE. THE SEVEN TYPES OF WASTE ARE:

STORAGE

b. Bins of parts VSM11 00.01.25
to 00.01.24

TRANSPORTATION

c. Fork truck VSM11 01.03.11 to
01.03.14

WAITING

d. 3 stoves on the line waiting
VSM2 00.23.55 to 00.23.59

MOTION

e. people walking to get parts
VSM11 01.52.38 to 01.52.41

INADEQUATE PROCESS

f. person at printer in shipping
VSM3 00.08.50 to 00.08.54

DEFECTS

g. people pointing to defect in
final assembly VSM3 00.44.16 to
00.44.20

AND OVER-PRODUCTION

h. tons of final product VSM11
01.01.41 to 01.01.45

SCENE 42.
final packaging VSM11 01.09.51
to 01.10.01

THE LAST WASTE, OVER-PRODUCTION, IS THE WORST
WASTE OF ALL BECAUSE IT AMPLIFIES ALL THE OTHER
WASTES.

SCENE 43.
people walking to next station
VSM11 01.12.09 to 01.12.14

LEARNING TO SEE WASTE IS NOT EASY. VALUE STREAM
MAPPING PROVIDES A GOOD WAY TO DOCUMENT AND
QUANTIFY THE EFFECTS OF ACCUMULATED WASTES ACROSS
A VALUE STREAM.

SCENE 44.
drawing the current state map
VSM6 00.01.55 to 00.02.05

BUILDING A VALUE STREAM MAP IS A THREE-STEP
PROCESS. THE FIRST STEP IS TO DRAW THE CURRENT
STATE MAP. NEXT, CREATIVITY AND TEAMWORK IS USED
TO MAP THE "IDEAL" VALUE STREAM OR FUTURE STATE,
WHICH IS ACTUALLY ONLY A SMALL STEP IN THE
DIRECTION OF "IDEAL".

Team talking in classroom
VSM10 00.01.49 - 00.02.03

SCENE 45.
Paul talking at end
VSM9 00.55.03 to 00.55.11

THEN LASTLY, AN IMPROVEMENT PLAN IS CREATED TO GET
YOU TO THE NEW TARGET CONDITION.

SCENE 46.
A3 diagram
VSM9 00.22.03 to 00.22.15

THE FUTURE STATE MAP WILL BE USED AS A TOOL TO
REVEAL THE TEAM'S IMPROVEMENT VISION TO OTHERS,
BUILDING SUPPORT AND A COMMON UNDERSTANDING FOR
THE PROPOSED NEW WAYS OF DOING BUSINESS.

SCENE 47.
show back cover from DVD.

THE SYMBOLS OF VALUE STREAM MAPPING ARE SHOWN ON
THE BACK COVER OF THIS DVD.

SCENE 48.
drawing a box
VSM9 00.20.59 to 00.21.17

USING THE SYMBOLS IS NECESSARY TO BUILD A COMMON
UNDERSTANDING OF A PROCESS - CURRENT OR TARGET.
AND JUST LIKE A LANGUAGE, THE MORE YOU PRACTICE
WITH THE SYMBOLS, THE BETTER YOU WILL BE AT USING
THEM TO COMMUNICATE.

SCENE 49. show close up of the board where the product mix can be seen VSM12 02.11.19 to 02.11.30	THE MAP WILL CONTAIN DIFFERENT PIECES OF DATA AND INFORMATION ABOUT THE VALUE STREAM. IT IS USEFUL TO BEGIN BY IDENTIFYING THE MIX OF PRODUCTS BEING BUILT AND TO CALCULATE THE TAKT TIME, OR RATE OF CUSTOMER DEMAND, FOR THE OVERALL VALUE STREAM BEING STUDIED.
SCENE 50.	FOR EACH OF THE DIFFERENT STEPS IN THE VALUE STREAM, THE FOLLOWING INFORMATION IS NEEDED:
CG: length of work day	THE LENGTH OF THE TYPICAL WORK DAY
Number of operators	THE NUMBER OF OPERATORS
Average daily production volume	AVERAGE DAILY PRODUCTION VOLUME
Takt time, also called customer demand rate.	TAKT TIME (ALSO CALLED THE CUSTOMER DEMAND RATE)
Cycle time	CYCLE TIME OF EACH PROCESS STEP
Changeover times	CHANGEOVER TIMES
Operational availability of machines	OPERATIONAL AVAILABILITY OF MACHINES
Days of stock on hand	DAYS OF STOCK ON HAND AT EACH STEP
Scrap rate	SCRAP RATE

SCENE 51.
VSM7 00.23.09 - 00.23.30
walks the value stream

AS THE TEAM WALKS THE VALUE STREAM, THEY WILL ACTIVELY TRY TO DISCOVER AND RECORD THIS INFORMATION. SIMPLE FORMS ARE USED TO REMIND THEM OF WHAT NEEDS TO BE CAPTURED FOR EACH VALUE STREAM STEP. THE FORMS WILL BE USED LATER TO BUILD THE CURRENT STATE MAP.

SCENE 52.
VSM3 00.17.40 to 00.17.56
Writing down on post-it notes

IN THE FACTORY, IT IS HELPFUL FOR TEAM MEMBERS TO USE POST-IT NOTES TO WRITE DOWN ISSUES AND OPPORTUNITIES THAT ARE UNCOVERED. FOR EXAMPLE, IT IS HELPFUL TO NOTE ANY OF THE SEVEN TYPES OF WASTE OBSERVED, TO CAPTURE IMPORTANT INPUT FROM OPERATORS, OR TO IDENTIFY A SAFETY OR ERGONOMIC ISSUE.

SCENE 53.
lady collecting post it notes
VSM11 00.16.47 to 00.16.59

ONE PERSON COLLECTS THE POST-IT NOTES AND COMPLETED FORMS FROM EACH VALUE STREAM STEP BEFORE MOVING ON SO THEY CAN BE ANALYZED BACK IN THE MEETING ROOM.

SCENE 54.
Show crowded assembly cell
VSM3 00.26.20 to 00.26.34

Worker talking to pat

IT'S IMPORTANT TO RESPECT THE KNOWLEDGE OF THE EMPLOYEES ON THE FACTORY FLOOR SINCE THE TEAM IS IN THEIR WORKPLACE. TRY TO STAY OUT OF THE WAY AND DO MORE LISTENING THAN TALKING.

SCENE 55.
VSM11 01.41.19 - 01.41.41

MAKE SURE YOU TELL THE WORKERS IN ADVANCE OF THE TEAM'S SHOP FLOOR VISIT AND THAT THEY UNDERSTAND THE PURPOSE OF THE VISIT. ASK THEM TO BE OPEN AND HONEST ABOUT THE CURRENT STATE OF AFFAIRS IN THEIR WORK AREAS.

SCENE 56.
team moving into next area
VSM11 01.27.06 to 01.27.20

THE HIGH LEVEL MAP OF THE ENTIRE STREAM WILL
CONSIST OF ONLY MAJOR PROCESS STEPS AND HOW THEY
ARE CONNECTED. ENCOURAGE THE TEAM TO MOVE QUICKLY
AND NOT GET CAUGHT UP TRYING TO CAPTURE EVERY
INDIVIDUAL OPERATIONAL WORK STEP.

SCENE 57.
VSM3 00.44.37 - 00.44.50

MOST VALUE STREAMS ONLY REQUIRE A FEW HOURS TO
GATHER THE DATA - NOT DAYS.

SCENE 58.
team watching assembly of stove
VSM11 00.29.55 to 00.30.15

IN DEVELOPING THE CURRENT STATE MAP AT JOTUL, THE
TEAM SPENT LESS THAN 4 HOURS OBSERVING THE WORK
AND CLEARLY UNDERSTOOD THAT A VALUE STREAM MAP WAS
TO REPRESENT A "REASONABLE APPROXIMATION" OF HOW
THE STOVE VALUE STREAM OPERATED ON A TYPICAL DAY.

SCENE 59.
VSM3 00.45.57 - 00.46.22

OF UTMOST IMPORTANCE WAS THAT THE STEPS WERE
COMPLETE AND IN THE CORRECT ORDER, THAT THE DATA
COLLECTED WAS REASONABLE IN THE EYES OF THE
WORKERS AND TEAM MEMBERS, AND THAT THE MAP AND
QUANTITIES COULD WOULD "MAKE SENSE" TO OTHERS WHO
VIEWED THE MAP AND KNEW THE PROCESS.

SCENE 60.
team talking at start of tour
VSM3 00.05.15 to 00.05.33

NOW LET'S FOLLOW THE TEAM AS THEY OBSERVE THE 16
STEPS OF THE CURRENT STOVE ASSEMBLY LINE.

SCENE 61.
ws shipping area
VSM3 00.05.53 to 00.06.03

WHEN GATHERING DATA FOR A VALUE STREAM MAP, IT IS
BEST TO START AT THE CUSTOMER END OF THE LINE AND
WORK BACK UP-STREAM THROUGH THE CHAIN OF CUSTOMERS
AND SUPPLIERS. FOR THIS VALUE STREAM, THIS MEANS
THE SHIPPING AREA, THE LAST STEP BEFORE CUSTOMERS
RECEIVE THEIR STOVES.

SCENE 62.
person writing in shipping
VSM3 00.10.08 to 00.10.14

HERE IN SHIPPING, THE TEAM OBSERVES COMPUTERS,
PRINTERS, AND THE VARIOUS DOCUMENTS PREPARED FOR
EACH SHIPMENT.

SCENE 63.
Driving to get stove (sped up)
VSM3 00.11.49 to 00.11.59

AFTER THE PAPER WORK IS PRINTED AND SIGNED, THE
EMPLOYEE GETS THE STOVE AND PLACES IT BY THE
SHIPPING DOOR, SIGNS MORE PAPER WORK AND CONTACTS
THE SHIPPING COMPANY FOR PICKUP. THE TEAM CAN
ALREADY MAKE SOME OBSERVATIONS ABOUT MOVEMENT,
WAITING, ETC.

VSM3 00.14.45 - 00.14.54
Signs more papers finishes
VSM3 00.16.17 - 00.16.27

SCENE 64.
VSM3 00.38.55 - 00.39.07

THE TEAM'S INPUT REGARDING KEY METRICS AND IDEAS
FOR WASTE ELIMINATION ARE COLLECTED AND PLACED IN
AN ENVELOPE.

SCENE 65.
Long shot, high angle
VSM3 00.24.31 - 00.24.47

THE NEXT STEP IS THE WAREHOUSE. JOTUL IS A BUILD-
TO-STOCK OPERATION. STOCK IS STORED AS A BUFFER TO
AVOID RUNNING OUT OF PRODUCT, ESPECIALLY DURING
THE BUSY MONTHS OF THEIR HIGHLY SEASONAL
OPERATION.

VSM3 00.25.10 - 00.25.17

HERE THE TEAM GATHERS DATA TO IDENTIFY THE NUMBER
OF PRODUCTS SITTING IN FINISHED GOODS INVENTORY.

SCENE 66.
pan of lots of stoves
VSM11 01.05.20 - 01.05.37

THE TEAM IDENTIFIES FINISHED GOODS AS A KEY FLOW
"STAGNATION" POINT FOR JOTUL, WITH MANY PRODUCTS
WAITING FOR CUSTOMER ORDER OR SHIPMENT.

SCENE 67.
vsm 03 00.32.51 - 00.33.05

CONTINUING UPSTREAM, THE NEXT AREA IS THE FINAL
INSPECTION AND PACKAGING STATION. THE TEAM BEGINS
BY COUNTING THE NUMBER OF STOVES IN THIS AREA.

SCENE 68.
Asking questions to assembly
workers

VSM3 00.34.49 - 00.35.12

AT EACH WORKSTATION THE TEAM ASKS THE WORKERS HOW MANY AND WHAT TYPES OF PROBLEMS THEY HAVE ON AN AVERAGE DAY AND WHAT STEPS COULD BE TAKEN TO FIX THE PROBLEMS. SOME OF THIS INFORMATION IS USEFUL TO CALCULATE THE PERCENTAGE OF QUALITY PROBLEMS, POTENTIAL CHANGEOVER OR OPERATIONAL AVAILABILITY ISSUES AT THE STEP.

SCENE 69.
glass prep, team watching

VSM3 00.36.49 - 00.37.09

THE NEXT OPERATION UPSTREAM IS THE AREA WHERE THE GLASS IS PREPARED AND INSTALLED. AS WITH ALL THE AREAS, CYCLE TIMES ARE RECORDED ALONG WITH MATERIAL ON HAND AND KEY DATA ON ACTIVITIES SUCH AS CHANGEOVER, UPTIME AND QUALITY ISSUES THAT TAKE AWAY FROM VALUE-ADDED WORK AND COMPROMISE VALUE STREAM FLOW.

SCENE 70.
crowd of people in work area

VSM3 00.27.03 - 00.27.11

VSM 11 01.15.40 - 01.15.55

ANOTHER REASON IT IS IMPORTANT TO TALK TO THE LINE WORKERS BEFORE THE TEAM OF OBSERVERS DESCENDS UPON THEM IS SO THEY DON'T FEEL THE NEED TO WORK FASTER OR SLOWER THAN NORMAL JUST BECAUSE THEY ARE BEING WATCHED.

SCENE 71.
assembly worker working
VSM11 01.06.49 - 01.07.06

THEY SHOULD WORK TO A NORMAL PACE THAT THEY COULD STAY AT ALL DAY LONG, EVERYDAY, SO THAT OBSERVED CYCLE TIMES ARE REALISTIC AND NORMAL.

SCENE 72.
gas leak test

VSM3 00.31.39 - 00.31.50

THE NEXT UPSTREAM STEP IS THE GAS TESTING STATION WHERE THE STOVES ARE FIRED UP AND EXAMINED FOR GAS LEAKS.

SCENE 73.
putting burner into stove
VSM11 00.21.20 - 00.21.38

NEXT THE TEAM OBSERVES THE INSTALLATION OF THE BURNERS DOCUMENTING HOW LONG IT TAKES AND THE NUMBER OF BURNERS STORED BY THE ASSEMBLY LINE. UNITS SITTING BY THE ASSEMBLY LINE ARE A SYMPTOM THAT FLOW HAS STOPPED AND POSSIBLY THAT OVERPRODUCTION HAS OCCURRED. THE TEAM ASKS QUESTIONS TO DISCOVER WHY INVENTORY IS "AT REST" AND WHETHER THE AMOUNTS ARE "BY DESIGN" OR "BY CHANCE".

SCENE 74.
vsm11 01.23.43 - 01.23.49

VSM3 00.59.17 - 00.59.28

THE BURNER ASSEMBLY STATION IS THE NEXT UPSTREAM OPERATION. HERE THE TEAM OBSERVES WIRES BEING CONNECTED, BOLTS BEING TIGHTENED AND VALVES BEING CONNECTED.

SCENE 75.
Vsm 03 01:01:52 - 01.02.19

PRIOR TO BEING ASSEMBLED, EACH BURNER ASSEMBLY STARTS WITH A WIRING HARNESS. VSM 03 01:01:52 THESE WIRES ARE CUT TO LENGTH, PLACED IN A PLASTIC CONDUIT, THEN SOLDERED TO A CONNECTOR.

Scene 75b
VSM11 01.25.27 - 01.25.40

DURING THE WALK-THROUGH IT IS ALSO IMPORTANT TO ASSESS THE STATE OF WORKPLACE ORGANIZATION AND CLEANLINESS, OR, FIVE S. DETERMINE IF THE PROCESS AREAS ARE BEING "VISUALLY CONTROLLED" TO DISCOVER PROBLEMS OR INTERRUPTIONS QUICKLY AND EASILY.

SCENE 76.
team looking at extra stuff on
shelves
VSM11 01.26.22 - 01.26.35
Bins sitting by itself on shelves
VSM2 00.03.02 - 00.03.07
cut on action
VSM11 01.26.43 - 01.26.48

FOR EXAMPLE, AS THE TEAM MEMBERS CONTINUE UP THE
VALUE STREAM, THEY TAKE NOTE OF ADDITIONAL
MATERIALS STORED NEXT TO THE ASSEMBLY LINE. IN ONE
CASE, THEY FIND A BIN OF MATERIALS CLEARLY MARKED,
HOWEVER ONCE THE BIN IS REMOVED FROM ITS LOCATION,
THERE IS NO INDICATION OF WHERE IT SHOULD BE
STORED.

SCENE 77.
Vsm 11 01.25.14 - 01.25.24

MARKING BOTH THE BIN AND THE LOCATION CONTRIBUTES
TO FEWER MISTAKES AND LESS TIME SEARCHING FOR
PARTS.

SCENE 78.
Vsm 02 00.08.27 - 00.08.40

Highlight the extra parts next
to the painter

PRIOR TO ASSEMBLY, SOME PARTS OF THE STOVE ARE
PAINTED BLACK. WHILE THE TEAM OBSERVES THE
PAINTING OPERATION THEY NOTICED SOME SMALL PARTS
LEANING ON A CRATE.

SCENE 79.
Painter walking to parts
VSM11 01.29.52 - 01.30.00

THIS SMALL MAKESHIFT STORAGE AREA TELLS THE
OBSERVERS THE PAINTER FEELS THE REGULAR STORAGE OF
THESE PARTS IS TOO FAR AWAY FROM HIM. THIS
INFORMATION IS IMPORTANT TO RECORD AND REPRESENTS
ANOTHER IMPROVEMENT OPPORTUNITY.

79b. VSM11 01.37.46 - 01.37.52

SCENE 80.
stacking parts on paint line
VSM12 02.30.41 - 02.30.57

IN THE PAINT AREA, CHANGEOVERS TAKE ABOUT 10
MINUTES FOR A DIFFERENT PAINT AND ABOUT 5 MINUTES
TO HAVE NEW COMPONENTS DELIVERED.

SCENE 81.
painting parts
VSM11 01.36.36 - 01.36.52

WHILE THIS SOUNDS LIKE A QUICK CHANGEOVER, ANY
TIME SPENT DOING THIS IS A WASTE AND MAY BE A
TARGET FOR IMPROVEMENT.

SCENE 82.
cart of parts.
VSM2 00.10.39 - 00.11.03
pan of cart.

TO KEEP THE PAINTER PAINTING AND NOT LOOKING FOR PARTS, JOTUL DELIVERS A KIT OF SHEET METAL PARTS ON A CART DIRECTLY TO THE LINE. THIS CART CONTAINS EVERY SHEET METAL PART NEEDED TO BUILD A TOTAL OF 35 STOVES. VSM02 12.03

SCENE 83.
cart of parts again
VSM2 00.11.36 - 00.12.18
83b. VSM2 00.14.47 - 00.14.58

THIS CART SYSTEM IS A GOOD EXAMPLE OF HOW JOTUL USES A KANBAN SYSTEM IN SOME AREAS TO "PULL" WORK THROUGH THE PLANT AND CONTROL HOW MUCH INVENTORY CAN BE MADE BY THE UPSTREAM PROCESS. ONCE THE 4 CARTS ARE FULL, THE OPERATIONS THAT MAKE THIS MATERIAL HAVE TO STOP AND WAIT UNTIL THEY RECEIVE AN EMPTY CART BEFORE BUILDING MORE PARTS.

SCENE 84.
firebox area, team talking
VSM2 00.18.33 - 00.18.54
84b. VSM2 00.24.26 - 00.24.42

UP STREAM FROM PAINT IS THE FIREBOX ASSEMBLY AREA. HERE SHEET METAL IS ASSEMBLED AND PLACED INSIDE THE STOVE. WHILE THERE, THE TEAM SEES DOZENS OF EXTRA FIREBOXES SITTING ON THE ASSEMBLY LINE.

SCENE 85.
show extra firebox inventory
VSM12 00.21.58 - 00.22.10

THIS EXTRA INVENTORY RAISES A RED FLAG FOR THE GROUP AND BRINGS UP QUESTIONS AIMED AT FINDING THE REASON FOR THE EXTRA FIREBOXES. AS IT TURNS OUT, THEY WERE BUILT TO BUFFER AN UPSTREAM CHANGEOVER IN WELDING AS WELL AS A DIFFERENCE IN SHIFT WORK TIMES.

SCENE 86.
Vsm11 01.38.42

NEXT, THE TEAM WATCHES THE DRILL AND TAP OPERATION WITHIN THE CAST IRON ASSEMBLY STATION. HERE THE TEAM OBSERVED EXCESSIVE MOVEMENT AS THE WORKER PERFORMED HIS MACHINING AND ASSEMBLY STEPS.

SCENE 87.
wooden crates stacked to ceiling
VSM11 01.43.03 - 01.43.19

THE CAST IRON FOR JOTUL STOVES IS SUPPLIED FROM
THE PARENT COMPANY IN NORWAY. THESE WOODEN CRATES
ARE FILLED WITH ALL THE VARIOUS CAST IRON PARTS
NEEDED TO ASSEMBLE STOVES.

SCENE 88.
Enamel stoves on assembly line
VSM12 01.32.10 - 01.32.22

BECAUSE MUCH OF THE CAST IRON PARTS ARE ALREADY
COATED WITH COLORED ENAMEL, JOTUL KEEPS A WIDE
VARIETY OF COLOR AND STYLES ON HAND TO MEET
CUSTOMER DEMAND. THIS AMOUNT OF INVENTORY HAS
PROVEN NECESSARY DUE TO AND SLOW DELIVERY TIMES
FOR THESE EXCEPTIONALLY HEAVY PARTS.

b. pan of wooden crates
VSM2 00.28.00 - 00.28.31
carry into next scene

SCENE 89.
video continues from 88b

BUT EVEN WITH THESE ISSUES, JOTUL STILL SEES THE
VALUE OF WORKING TO REDUCE THE AMOUNT OF STAGNANT
INVENTORY.

SCENE 90.
sheet metal welding

ALL OF THE INTERNAL FIREBOXES OF A JOTUL STOVE ARE
BUILT WITH WELDED SHEET METAL CONSTRUCTION. THE
WELDING PROCESS IS DONE WITH A COMBINATION OF
ROBOTIC AND MANUAL OPERATIONS.

SCENE 91.
more welding of fireboxes

WHILE MOST OF THE STEPS IN THE STOVE ASSEMBLY
PROCESS CAN BE FINISHED IN ABOUT 8 MINUTES, THE
FIREBOX WELDING CAN TAKE FROM 10 TO 20 MINUTES
DEPENDING ON THE STYLE OF STOVE.

SCENE 92.
more welding
VSM12 02.23.10 - 02.23.22

TO KEEP UP WITH THE REST OF THE FACTORY, THE
WELDING DEPARTMENT IS CURRENTLY WORKING TWO SHIFTS
TO MEET DEMAND.

SCENE 93.
vsm02 00.43.26 - 00.43.40

THE SHEET METAL USED TO BUILD THE FIREBOX COMES FROM SEVERAL NEW MACHINES. JOTUL HAS PURCHASED SHEET METAL PRESS BRAKES TO MAKE THE WIDE VARIETY OF BENDS REQUIRED FOR EACH UNIT.

93b. VSM12 02.25.25 - 02.25.32

A LASER TRIMS PARTS TO FINAL SIZE AND A PUNCH PRESS CUTS THE SHEET STOCK TO SIZE AND MAKES THE REQUIRED HOLES IN THE MATERIAL.

93c. VSM2 00.38.31 - 00.38.53

SCENE 94.
vsm02 00.45.05 - 00.45.20

THERE HAVE BEEN SUCCESSFUL EFFORTS TO REDUCE CHANGEOVER ACTIVITIES ON THIS EQUIPMENT, RESULTING IN ENHANCED FLOW AND REDUCED BATCH SIZES.

94b. VSM2 00.46.20 - 00.46.39

HOWEVER, THE TEAM RECOGNIZES THAT EQUIPMENT CHANGEOVER IS NON-VALUE-ADDED AND REPRESENTS A KEY REASON JOTUL CAN NOT CURRENTLY PRODUCE ONE AT A TIME IN SOME AREAS.

SCENE 95.
drawing current state map in
classroom
VSM2 00.51.30 - 00.51.55

RIGHT AFTER THE TEAM FINISHES THEIR OBSERVATIONS, THEY RETURN TO THE MEETING ROOM AND START DRAWING THE CURRENT CONDITION VALUE STREAM MAP USING THE DATA GATHERED FROM THE VALUE STREAM WALK.

SCENE 96.
Mfg of stoves, shot by Steve,
day two
VSM11 01.13.34 - 01.13.54

WHILE IT MAY SOUND LIKE THERE ARE SOME PROBLEMS WITH THE MANUFACTURING SYSTEM AT JOTUL, THE OVERALL SYSTEM IS CURRENTLY VERY PRODUCTIVE, MAKING OVER 65 STOVES EVERY DAY.

Work instructions:

VSM02 00.45.35 - 00.46.13

IT IS IMPORTANT TO NOTE THAT A VALUE STREAM MAPPING EXERCISE SHOULD POINT OUT THE "GOOD" THINGS OR BEST PRACTICES AS WELL AS THE IMPROVEMENT OPPORTUNITIES. PERHAPS THESE BEST PRACTICES CAN BE SPREAD TO OTHER PARTS OF THE VALUE STREAM IN THE TARGET CONDITION.

SCENE 97.

Vsm 02 00.54.02 - 00.54.40

CARRY INTO NEXT SCENE

THE CURRENT STATE MAP IS MADE UP OF A SERIES OF BOXES, EACH REPRESENTING A MAJOR VALUE STREAM STEP IN THE MANUFACTURING PROCESS...

SCENE 98.

continue from 97

...WITH THE CUSTOMER ON THE RIGHT SIDE AND THE SUPPLIER ON THE LEFT SIDE.

SCENE 99.

pan of push system line

VSM2 00.58.05 - 00.58.23

NEXT ARROWS ARE DRAWN TO INDICATE HOW THE MAJOR PROCESS BLOCKS ARE CONNECTED TO ONE ANOTHER. IN JOTUL'S CASE, SEVERAL ARROWS WITH VERTICAL LINES ARE SHOWN BETWEEN SOME OF THE BOXES. THIS INDICATES A PUSH SYSTEM OF PRODUCTION RATHER THAN A 'PULL' SYSTEM TRIGGERED BY ACTUAL NEED OF THE INTERNAL CUSTOMER. THE STRIPED ARROW INDICATES A BAD CONDITION, ONE THAT CAUSES MATERIAL STAGNATION.

VSM2 01.00.34 - 01.00.52

SCENE 100.

data box for each process step

VSM6 00.27.28 - 00.27.56

FOR EACH STEP IN THE PROCESS THEY RECORDED HOW MUCH TIME WAS SPENT ADDING VALUE. THESE CYCLE TIMES WERE THEN ADDED UP TO COME UP WITH THE TOTAL VALUE-ADDED TIME IT TAKES FOR ONE STOVE TO GO THROUGH THE SYSTEM, OR TO BE TRANSFORMED FROM RAW MATERIALS INTO A FINISHED STOVE.

SCENE 101.
writing data onto white board

VSM6 00.34.29 - 00.34.44

IT TOOK 131 MINUTES OF OVERALL STOVE ASSEMBLY AND 160 MINUTES TO BUILD THE INTERNAL FIREBOX - A TOTAL OF 291 MINUTES OF CYCLE TIME TO BUILD A STOVE.

SCENE 102.
drawing on white board

VSM6 00.35.05 - 00.35.35

THEY THEN CALCULATED HOW MUCH STAGNATION TIME WAS IN THE CURRENT VALUE STREAM BY TRANSLATING THE AMOUNT OF MATERIAL QUEUED IN THE VALUE STREAM INTO ITS CORRESPONDING AMOUNT OF TIME. THIS IS DONE BY MULTIPLYING THE QUANTITY OR PARTS COUNTED IN AN AREA BY THE TAKT TIME. SOME MANUFACTURES REFER TO THESE QUEUES AS "WIP - WORK IN PROCESS", BUT A LEAN THINKER WILL SEE THIS AS "STAGNATION".

102b. VSM2 00.22.39 - 00.22.59

SCENE 103.
VSM2 00.24.21 - 00.24.41

VSM6 00.37.06 - 00.37.21

VSM6 00.37.35 - 00.37.41

FOR EXAMPLE, IF 50 FIREBOXES WERE FOUND IN AN AREA AND THE CUSTOMER NEEDS A FIREBOX EVERY 20 MINUTES (TAKT TIME), THEN THE 50 FIREBOXES ARE THE EQUIVALENT OF 1000 MINUTES OF TIME. BY ADDING UP THE AMOUNT OF QUEUES SITTING IN FRONT OF EACH STEP, THE TEAM COULD SEE HOW MUCH STAGNATION WAS BUILT INTO THE CURRENT CONDITION VALUE STREAM. THE TOTAL AMOUNT OF STAGNATION TIME ACROSS THE VALUE STREAM WAS CALCULATED BY THE TEAM AS 485 MINUTES.

SCENE 104.
manufacturing of stoves, day two
VSM12 02.24.16 - 02.24.48

TO ARRIVE AT THE OVERALL PRODUCTION LEAD TIME OF 776 MINUTES FOR THE STOVE ASSEMBLY PROCESS, THE TEAM ADDED THE TOTAL CYCLE TIME FOR A STOVE (291 MINUTES) TO THE TOTAL STAGNATION TIME (WHICH IN OUR EXAMPLE IS 485). THIS NUMBER IS A KEY OUTCOME FROM THE CURRENT STATE MAPPING EXERCISE. IT IS IMPORTANT FOR THE TEAM TO DETERMINE WHAT PORTION OF THE EXPECTED TIME A PRODUCT WILL BE IN THE JOTUL VALUE STREAM IS REALLY TIME THE CUSTOMER IS WILLING TO PAY FOR. ALL THE OTHER TIME, WAITING OR STAGNATION, SHOULD BE A TARGET FOR IMPROVEMENT, AND BE REDUCED OR ELIMINATED OVER TIME.

104b. VSM12 02.29.11 - 02.29.39

104c. VSM3 00.21.35 - 00.21.44

SCENE 105.
team talking in classroom
VSM6 00.44.19 - 00.44.35

NEXT, THE TEAM MAPS OUT AND DISCUSSES THE INFORMATION FLOW FOR STOVE PRODUCTION, OR HOW INSTRUCTIONS ARE GIVEN TO JOTUL EMPLOYEES AND SUPPLIERS ABOUT WHAT TO MAKE OR PROVIDE AND WHEN. THIS INCLUDES DISCUSSIONS ON HOW RAW MATERIAL IS CURRENTLY ORDERED AND SUPPLIED.

SCENE 106.
show boat on white board,
VSM12 02.13.14 - 02.13.27
Cu of cast iron parts in wooden
crate
VSM2 00.29.17 - 00.29.29

THE JOTUL TEAM NOTED THAT BECAUSE THE PARENT COMPANY IS IN NORWAY, IT DOES ACTUALLY SEND A **BOATLOAD** OF INVENTORY WHEN SHIPPING CAST IRON PARTS FOR THE STOVE TO THE GORHAM, MAINE SITE.

SCENE 107.
team talking in classroom,
VSM12 02.12.10 - 02.12.18

Shot of white board with Angie
in picture.
107b. VSM12 02.12.04 - 02.12.24

FOR THE REST OF THE PARTS, THE TEAM DISCUSSES THE
CURRENT METHOD OF PRODUCTION PLANNING AND HOW THE
MONTHLY FORECASTING AND MRP SYSTEM DRIVES THE
CURRENT ORDERING AND PRODUCTION PROCESS. IT IS
ALSO DETERMINED AS TO WHETHER THE SYSTEMS ARE
"PUSH" OR "PULL" IN NATURE.

SCENE 108.
ws of map current state
VSM7 00.02.35 - 00.02.42

Team talking at end of day one
VSM6 00.49.49 - 00.50.06

AT THE END OF THE FIRST DAY, THE MAP OF THE
CURRENT STATE IS FINISHED AND THE TEAM IS IN
AGREEMENT THAT IT IS A "REASONABLE" REPRESENTATION
OF HOW THE STOVE VALUE STREAM OPERATES TODAY.
EVERYONE ON THE TEAM ACKNOWLEDGES THAT THEY
LEARNED A LOT FROM OBSERVING THE ACTUAL WORK BEING
PERFORMED.

SCENE 109.
show workers working on day two,
assembly area
VSM11 01.37.23 - 01.37.40

THEY WERE SURPRISED AT HOW MANY PARTS WERE BEING
MOVED TWICE, ONCE TO THE LINE SIDE STORAGE AREA,
AND THEN AGAIN TO WHERE IT IS CONVENIENT FOR THE
WORKER.

SCENE 110.
ergo lift table in use
VSM11 01.06.28 - 01.06.41

ALSO, EVEN THOUGH JOTUL HAD INVESTED IN ERGONOMIC
LIFT TABLES, THE TEAM WAS SURPRISED TO SEE HOW
MANY WORKERS WERE STILL DOING WORK THAT LOOKED
DIFFICULT OR PRONE TO INJURY.

SCENE 111.
writing on post-it notes
VSM11 01.23.26 - 01.23.35

IN MAPPING THE CURRENT STATE, THEY WROTE UP MANY
POST-IT NOTES ABOUT AREAS THAT COULD USE IMMEDIATE
IMPROVEMENT.

SCENE 112.
assembly of stoves
VSM3 00.37.39 - 00.37.44

THE SIMPLE AND EASY IDEAS COULD BE IMPLEMENTED
RIGHT AWAY.

SCENE 113.
Vsm3 00.53.03 - 00.53.19

OTHER IDEAS THAT MIGHT NOT BE IMMEDIATELY IMPLEMENTABLE, WOULD BE DISCUSSED AND CONSIDERED FOR INCORPORATION INTO THE FUTURE STATE MAP, WHICH WOULD BE DRAWN ON THE SECOND DAY OF THE MAPPING SESSION.

SCENE 114.

FADE TO BLACK

SCENE 115.
team reading the post it notes
VSM7 00.47.37 - 00.47.45

THE NEXT MORNING THE TEAM WENT THROUGH THE GROUPS OF POST-IT NOTES COLLECTED AT THE 16 PROCESS STEPS.

SCENE 116.
More reading the post it notes
VSM7 00.52.33 - 00.52.46

AS THEY LOOKED AT THESE NOTES, THEY ASSESSED EACH SITUATION BY DISCUSSING ANY BOTTLENECKS OR FLOW-RELATED PROBLEMS OBSERVED.

SCENE 117.
team talking about inventory
VSM7 00.54.46 - 00.55.00

THEY WERE ALSO FOCUSING ON THE "STRIPED ARROWS", OR PLACES WHERE INVENTORY WAS BEING PUSHED, NOT PULLED, THROUGH THE SYSTEM.

SCENE 118.
team talking in room
VSM7 00.56.28 - 00.57.05

AFTER EXAMINING ALL OF THE CURRENT STATE INFORMATION GATHERED FROM OBSERVATION OF THE ASSEMBLY LINE, THE TEAM NEEDED TO BOIL EVERYTHING DOWN INTO A SUMMARY OF THE BIGGEST PROBLEMS. THIS STEP HELPED THE TEAM REACH AGREEMENT ON THE AREAS TO FOCUS ON FOR THE TARGET CONDITION MAPPING EXERCISE.

SCENE 119.
unlabeled inventory on the shop floor
VSM11 01.17.01 - 01.17.18

FOR JOTUL, ONE OPPORTUNITY THE TEAM UNCOVERED WAS TO USE BETTER VISUAL CONTROLS TO TELL WHERE THINGS SHOULD BE STORED AND HOW MANY SHOULD BE THERE.

SCENE 120.
any person walking
VSM11 01.01.38 - 01.38.47

THEY ALSO FELT A BETTER LAYOUT OF THE ASSEMBLY
LINE WOULD HELP REDUCE EXCESSIVE WALKING.

SCENE 121.
line side storage
VSM2 00.04.54 - 00.05.16

OTHER WASTE THEY OBSERVED WAS TOO MUCH INVENTORY
STORED ON THE LINE AND THE LENGTH OF TIME IT TOOK
TO CHANGEOVER TO A NEW PART FOR DIFFERENT MODEL
STOVES.

SCENE 122.
going through the binders from
the laser workstation
VSM3 00.59.38 - 00.59.5

ONE ISSUE PAT OBSERVED WAS THE LACK OF WORK
STANDARDS POSTED AT THE WORKSTATION. FOR EXAMPLE,
A NEW EMPLOYEE HAD TIME TO MAKE A FEW EXTRA VALVES
SINCE SHE HAD WORKED FASTER THAN NORMAL ON
PREVIOUS STOVES.

SCENE 123.
worker in burner assembly
VSM11 01.22.03 - 01.22.19

IT WOULD BE LESS WASTEFUL TO USE THE EXTRA TIME TO
CLEAN THE WORK AREA OR TRAIN WITH AN UPSTREAM OR
DOWNSTREAM TEAM MEMBER. THIS IS AN EXAMPLE OF
OVERPRODUCTION.

123b. VSM3 01.00.07 - 01.00.30

STANDARDIZED WORK INSTRUCTIONS POSTED AT THE WORK
AREA MINIMIZE THE LIKELIHOOD THAT OPERATORS WILL
"FINISH EARLY" BY ESTABLISHING WORK TIME STANDARDS
AND DEFINES ACCEPTABLE LEVELS OF WIP INVENTORY.

SCENE 124.
More line side storage
VSM11 01.14.38 - 01.14.50

PAT ALSO MADE A SUGGESTION ABOUT HAVING A BETTER
DEFINED MATERIAL HANDLING FUNCTION FOR PARTS
STAGED BY THE ASSEMBLY LINE.

SCENE 125.
Assembly person working
VSM11 01.18.21 - 01.18.31

THIS WOULD KEEP THE ASSEMBLY PEOPLE DOING VALUE-
ADDED WORK INSTEAD OF SEARCHING FOR MATERIALS.

SCENE 126.
batch of stoves being pulled
into workstation
VSM3 00.35.42 - 00.35.51

THE RESULTS OF THIS PROBLEM ARE THE WASTES OF
INVENTORY STAGNATION, BATCHING, WALKING, AND
SEARCHING.

SCENE 127.
team talking in classroom
VSM12 02.10.34 - 02.10.46
FREEZE last frame and turn blue
for text background

NOW THAT THEY CAN SEE AND QUANTIFY THE CURRENT
STATE USING THE VALUE STREAM MAP, THE TEAM SPENDS
SOME TIME CONSIDERING WHAT THE IDEAL CONDITION
WILL LOOK LIKE FOR THE STOVE VALUE STREAM. THEY
ARE REMINDED TO STRIVE FOR A PULL SYSTEM, WITH
FREQUENT WITHDRAWAL OF MATERIALS, MINIMAL WIP AND
SUPPORTING INVENTORIES, AND THE MOST EFFECTIVE USE
OF OPERATORS AND EQUIPMENT.

CG TEXT:
PULL SYSTEM
FREQUENT WITHDRAWAL
MINIMAL WIP
EFFECTIVE USE OF OPERATORS

SCENE 128.
one stove being pulled into the
next operation.
VSM3 00.35.16 - 00.35.40

ALL THE PROCESSES ARE TO BE CONNECTED AND
SYNCHRONIZED ACCORDING TO CUSTOMER NEEDS. EVERY
TIME A STOVE IS SOLD, THIS INFORMATION IS FED BACK
THROUGH THE VALUE STREAM TO CAUSE MATERIAL TO FLOW
THROUGH THE PRODUCTION TRANSFORMATION PROCESSES.

SCENE 129.
one stove being assembled
VSM3 00.48.15 - 00.48.32

THE IDEAL CONDITION IS ALSO TO BE FLEXIBLE ENOUGH
TO BUILD EVERY STOVE EVERY DAY IN LOT SIZES OF
ONE.

SCENE 130.
team talking in classroom
VSM8 00.58.50 - 00.59.09

NOW THAT THE TEAM HAS AN UNDERSTANDING OF THE
IDEAL CONDITION, THEY ARE CHALLENGED BY PAT TO
COME UP WITH A TARGET CONDITION THAT IS A STEP IN
THE DIRECTION OF IDEAL.

SCENE 131.
team in classroom,
VSM9 00.00.12 - 00.00.58

THIS NEW FUTURE STATE MAP WILL SHOW THE BEST PRACTICAL CONDITION THE TEAM BELIEVES CAN BE REACHED BY THE TARGETED DATE. THE TARGET DATE SHOULD NOT BE ONE TO TWO YEARS DOWN THE ROAD, BUT A PLAN THAT CAN BE ACHIEVED IN SIX MONTHS OR LESS. AS PART OF DRAWING THE TARGET CONDITION MAP, THE TEAM WILL:

blue background
GC:
-IDENTIFY KAIZEN ACTIVITIES

-IDENTIFY KEY MEASURES REQUIRED

-PRIORITIZE EACH IMPROVEMENT

-ESTABLISH A TIME FRAME

- IDENTIFY THE AREAS WHERE KAIZEN ACTIVITIES ARE NEEDED TO REACH THE IMPROVED STATE,

- IDENTIFY KEY MEASURES REQUIRED FOR SUCCESS,

- PRIORITIZE EACH IMPROVEMENT AND

- ESTABLISH A TIME FRAME FOR COMPLETION.

SCENE 132.
drawing future state map
VSM9 00.20.10 - 00.20.20

THE FUTURE STATE MAP FOR THIS VALUE STREAM WAS DRAWN WITH ONLY 6 STEPS IN THE PROCESS, SIGNIFICANTLY LESS THAN THE ORIGINAL 16. THIS REFLECTS THE CHANGES PROPOSED, WHICH WOULD COMBINE MANY OF THE DISTINCT ASSEMBLY OPERATIONS.

Start next scene early- here---

SCENE 133.
Pan of future state, stop at
assembly area of map
VSM9 00.21.59 - 00.22.17

THE LARGEST IMPROVEMENT WOULD BE CHANGING FROM HAVING SIX WORKSTATIONS THAT DO ELECTRICAL ASSEMBLY, VALVE ASSEMBLY, PILOT ASSEMBLY, BURNER ASSEMBLY, GLASS ASSEMBLY AND FINAL PACKING, TO A SINGLE FINAL ASSEMBLY AND PACKING AREA.

SCENE 134.
assembly area busy with no
observers
VSM12 02.35.46 - 02.35.54

THIS WILL REQUIRE A SIZEABLE AMOUNT OF WORK TO PLAN FOR THE MOST PRODUCTIVE USE OF THE MATERIALS AND WORKERS NEEDED IN THIS SPACE.

SCENE 135.
team talking about production
scheduling
VSM9 00.22.46 - 00.23.05

AS THE DISCUSSION CONTINUES THE TEAM FOCUSES ON
THE SYSTEM USED TO COMMUNICATE PRODUCTION
SCHEDULING. THEY PROPOSE MOVING FROM PUSH TO PULL,
AND INTRODUCING A SET NUMBER OF KANBAN CARDS EACH
MORNING FOR EACH STOVE BUILT THAT DAY.

SCENE 136.
Vsm09 00.24.13 - 00.24.29

THESE CARDS WILL REPRESENT REQUIREMENTS FOR
CUSTOMERS AND MAINTAIN THE VARYING STOCK LEVELS
NECESSARY TO HANDLE JOTUL'S HIGHLY SEASONAL
DEMAND.

SCENE 137.
VSM9 00.20.58 - 00.21.17

THE TEAM PROPOSES SENDING CUSTOMER INFORMATION TO
ONLY ONE POINT IN THE PROCESS, THE WAREHOUSE.
USING A PICK TICKET, THE WAREHOUSE WILL SHIP THE
ORDER. AFTER SHIPPING, THE KANBAN CARD WHICH IS
TO BE STORED WITH EACH STOVE WILL BE RETURNED TO
THE PLANNER.

VSM9 00.36.14 - 00.36.25

SCENE 138.
building stoves
VSM2 00.16.39 - 00.17.02

THE PLANNER RE-ISSUES THE KANBAN CARDS INTO THE
PRODUCTION PROCESS AS NEEDED TO COVER DEMAND. BY
LOWERING THE NUMBER OF KANBAN CARDS IN THE SYSTEM
IN THE SLOW SEASON, THERE IS CONTROL OVER THE
NUMBER OF STOVES BEING BUILT. THEN IN THE BUSY
SEASON, MORE CARDS ARE ADDED TO MEET HIGHER
DEMAND.

138b. VSM2 00.21.45 - 00.21.59

SCENE 139.
VSM9 00.32.25 - 00.32.46

OVERALL, THE VALUE STREAM WILL BE PULLING WORK THROUGH THE PLANT, AND THE FINAL ASSEMBLY AREA WILL BE SET UP AS THE PACEMAKER OF THE PULL PROCESS. A DAILY RATE OF PRODUCTION WILL BE

139b. VSM2 00.26.11 - 00.26.32

AGREED UPON BETWEEN PLANNING AND THE PLANT FOR A MONTH-LONG PERIOD. THE TEAM DISCUSSES BREAKING THE DAILY RATE DOWN INTO HOURLY BUCKETS AND

139c. VSM9 00.24.41 - 00.24.58

RECORDING OUTPUT EACH HOUR AT THE END OF FINAL ASSEMBLY. THIS WILL GIVE WORKERS AN UNDERSTANDING OF EVEN FLOW AND A MEANS TO QUICKLY TELL EVERYONE WHEN THE CUSTOMER PACE IS BEING MISSED.

SCENE 140.
VSM9 00.52.28 - 00.52.44

AFTER SOME ADDITIONAL PLANNING, THE TEAM COMES UP WITH A LIST OF PROJECTS OR KAIZEN EVENTS NEEDED TO GET JOTUL TO THE FUTURE STATE.

SCENE 141.
Paul Anderson reading the list
of projects
VSM9 00.56.00 - 00.56.30

THIS LIST INCLUDES CHANGES LIKE SETTING UP A KANBAN CARD SYSTEM FOR EACH DAY'S PRODUCTION, CHANGING TO A TRUE PULL SYSTEM INTERNALLY AND WITH KEY SUPPLIERS INSTEAD OF SENDING PURCHASE ORDERS, COMBINING MULTIPLE ASSEMBLY AREAS INTO ONE ASSEMBLY CELL, AND STANDARDIZING THE MATERIAL HANDLING OPERATIONS SO THEY DO NOT INTERFERE WITH THE VALUE-ADDED WORK.

SCENE 142.
Team talking in classroom
VSM9 00.58.49 - 00.59.10

ALONG WITH THESE PLANS, THE TEAM HAS ESTABLISHED DATES FOR THE COMPLETION OF EACH OF THESE PROJECTS.

SCENE 143.
VSM10 00.08.22 - 00.08.45

THIS TIMELINE IS NECESSARY TO MAKE SURE THE WORK GETS COMPLETED DESPITE THE DAILY WORK OF BUILDING AND SHIPPING STOVES. A TIME LINE IS ALSO IMPORTANT TO "SELLING" THE PLAN TO UPPER MANAGEMENT SINCE RESOURCES WILL BE NEEDED TO MAKE THE PROPOSED CHANGES.

SCENE 144.
VSM12 02.29.25 - 02.29.52

AFTER COMING UP WITH THE PLAN, THE IMPROVEMENTS ARE QUANTIFIED IN TERMS OF QUALITY, COST, LEAD TIME, AND FLEXIBILITY. THE MANAGEMENT TEAMS NEEDS TO KNOW WHAT TO EXPECT AFTER ALL THE WORK IS ACCOMPLISHED.

SCENE 145.
pat holding an A3 Diagram up in
classroom
VSM7 00.36.23 - 00.36.36
carry into next scene----

A PERFECT TOOL FOR SUMMARIZING THIS IS AN A3 DIAGRAM. THE A3DIAGRAM HAS 4 KEY ELEMENTS:

SCENE 146.
cover with video from last Scene

1. THE BACKGROUND INFORMATION AND A CURRENT STATE MAP IN THE UPPER LEFT,

follow pat as she points to each
area of the map
146b. VSM7 00.36.44 - 00.37.08

2. BELOW THAT IS A LIST OF PROBLEMS THE TEAM HAS FOUND WITH THE CURRENT STATE AND WHAT THE CONSEQUENCES ARE OF THOSE PROBLEMS.

SCENE 147.
carry from 146b

3. IN THE UPPER RIGHT, IT HAS A FUTURE STATE MAP AND A LIST OF THE KEY COUNTERMEASURES AND THEIR ANTICIPATED EFFECTS ON THE VALUE STREAM.

Carry from 146b.

4. BELOW THAT IS A PLAN WHICH INCLUDES MILESTONES AND A TIME LINE FOR ACCOMPLISHING THE FUTURE STATE, AS WELL AS KEY BEFORE-AND-AFTER MEASURES.

SCENE 148.
VSM7 00.37.28 - 00.37.55

THE A3 DIAGRAM IS A SIMPLE AND EASY TOOL FOR MAKING THE CASE FOR VALUE STREAM CHANGES. IT CAN ALSO BE HELPFUL FOR MEASURING PROGRESS AND KEEPING THE FUTURE-STATE PROJECT ON TRACK.

SCENE 149.
VSM1 00.17.12 - 00.17.30

VALUE STREAM MAPPING IS AN IMPORTANT CONTINUOUS IMPROVEMENT TOOL, ONE THAT HELPS US STEP BACK AND UNDERSTAND THE SERIES OF STEPS, BOTH VALUE-ADDED AND NON-VALUE ADDED NECESSARY TO SATISFY CUSTOMERS.

SCENE 150.
assembly of fire boxes
VSM3 00.20.30 - 00.20.46

IT IS A CRITICAL "GO SEE" METHOD THAT ENGAGES THE TEAM AS THEY LEARN HOW TO DOCUMENT AND QUANTIFY MATERIAL AND INFORMATION FLOWS. IT IS A SPRING BOARD POINTING TO OPPORTUNITIES FOR IMPROVEMENT.

SCENE 151.
team observing the mfg.
VSM3 00.40.10 - 00.40.34

LIKE THE CONTINUOUS IMPROVEMENT SYSTEM IT IS A PART OF, VALUE STREAM MAPPING IS MEANT TO BE AN ITERATIVE PROCESS, MOVING FROM CURRENT STATE TO FUTURE STATE TO CURRENT STATE TO FUTURE STATE.

SCENE 152.
VSM3 00.42.28 - 00.42.49

AND IT REFLECTS THE KAIZEN SPIRIT— CONCENTRATING ON CHANGES THAT CAN BE MADE NOW TO TAKE A STEP IN THE DIRECTION OF PERFECTION, OR TOWARD THAT IDEAL STATE. AND LIKE KAIZEN, THE ONLY WAY TO GET GOOD

152b. VSM11 01.42.00 - 01.42.17

AT VALUE STREAM MAPPING IS TO "GO SEE" AND PRACTICE.

SCENE 153.
VSM12 02.15.33 - 02.15.40
CG: Scott Clinch
Manufacturing Manager
Jotul North America

WE ASKED SCOTT CLINCH, MANUFACTURING MANAGER WHAT HE EXPERIENCED DURING THE MAPPING PROCESS.

SCENE 154.
vsm12 02.14.21 to 02.14.49

We get so involved in our day to day planning, that we don't see, we walk right by the opportunities and this has certainly shed the light on it. And what I think helps to is having the entire team together as far as people from different departments because they come into it without any preconceived notions or knowing, or probably not knowing much about really goes on in that department and can see things we would never see, or as questions we would never ask.

SCENE 155.
VSM12 02.45.45 - 02.45.51

NEXT, BRET WATSON, PRESIDENT OF JOTUL NORTH

Bret Watson
President
Jotul North America

AMERICA, SHARED WHAT HE WAS HOPING TO TAKE AWAY FROM THE EVENT.

SCENE 156.
vsm12 00.46.44 to 00.47.11

The immediate take away is , we thought we were good, but we have a long way to go and it took Toyota dozens of years to get to where they are now and any company that embarks on a lean manufacturing, its a journey and we are in year 7, but what came about yesterday is we are really at about year 2 of being serious about lean with a pull system that we thought was a pull system is actually just a push system .

SCENE 157.
VSM2 00.27.00 - 00.27.21

BRET ALSO SAW SOME THINGS THAT REMINDED HIM OF HOW IMPORTANT IT IS TO TREAT EVERY EMPLOYEE AS A CUSTOMER.

SCENE 158.
vsm12 00.48.04 - 00.48.31

Anything that they were doing that we did not think was being done right is a direct result of us not treating them like a customer, or training them or giving them an education on the best way of doing things from an engineering stand point, from a materials stand point umm, we just again, the awareness, the most enlightening part is just the awareness of making sure our customer has everything at his disposal on the line to build our products.

SCENE 159.
PAT WARDWELL, Senior Continuous
Improvement Manager, GBMP

VSM 12 10.05 to 10.31

This is 90% about the people and if you are not engaged with the people then you are not able to appreciate what happens everyday. And also I think they work extremely hard, very often under conditions that are less than optimal and they do a heck of a job despite all the little interruptions, disruptions, issues that occur everyday.

FADE TO BLUE/black screen with credit roll.

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SCENE 160.
CG: credit roll
white text on black, fade up
mid-screen

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GREG SHEREMET

WRITTEN BY: STEVEN BOLLINGER

TECHNICAL & EDITORIAL CONSULTING:

ROSEMARY CSIZMADIA
BRUCE HAMILTON
PAT WARDWELL

SCENE 161.
tape 40, 01:00:00-01:00:12
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