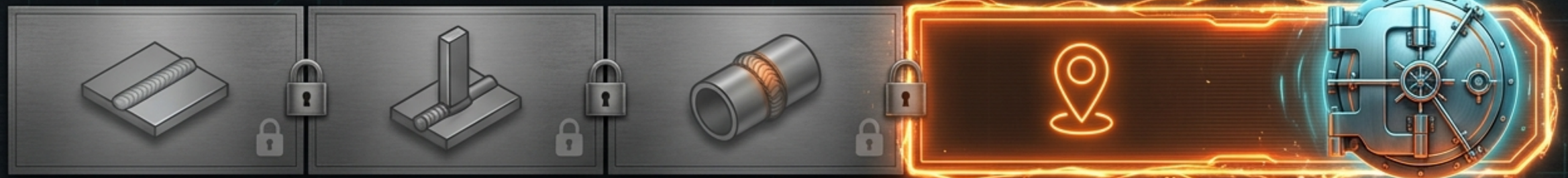

SYSTEM ONLINE
930
1600
300
1200
Game 11: Fabrication Sim
The RTS Utility Trailer Challenge
Gemini Notebook

SEASON 4: MASTERS—FROM OPERATOR TO ARCHITECT



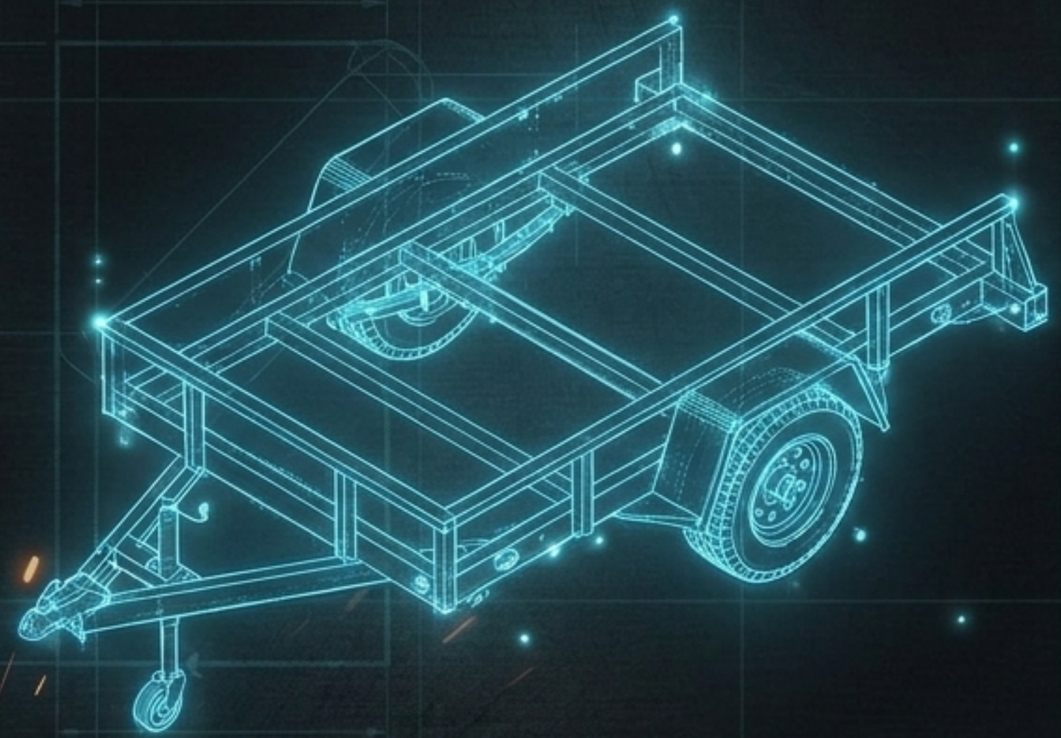
PREVIOUS MILESTONES CLEARED

- Puddle Control
- 6G Pipe (Inclined 45°)
- Inspection Hunt (Defect Detection)

CURRENT STATUS

Training wheels removed. The player must now synthesize isolated welding mechanics into a full-scale, real-world structural build.

Gemini Notebook



MISSION PARAMETERS: STRUCTURAL ASSEMBLY

FORMAT:
Real-Time Strategy (RTS) Fabrication

PRIMARY OBJECTIVE:
Translate 2D blueprint to 3D utility trailer base frame.

ACTIVE ENVIRONMENTAL HAZARDS:
- Fume Ventilation Management
- Fire Watch Protocol (OSHA 29 CFR 1910.252 compliant)

SCORING PILLARS:

ACCURACY
(Blueprint Match)

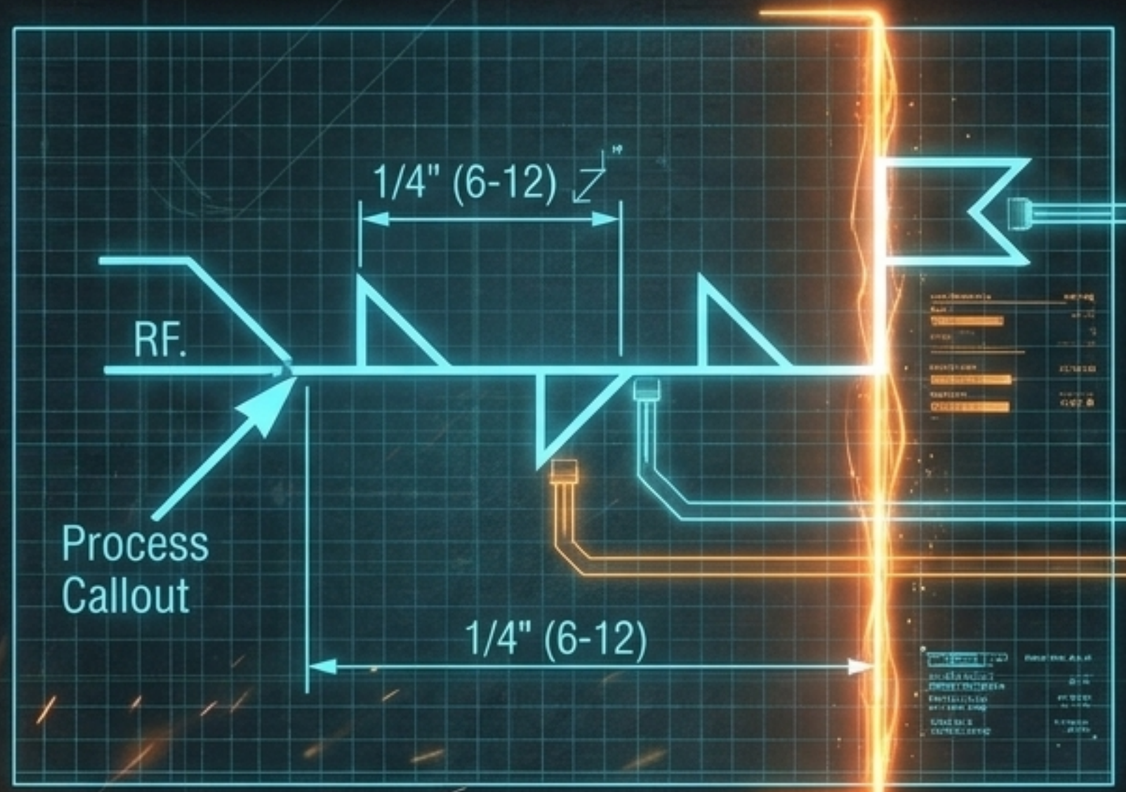
CONSISTENCY
(Time Management)

SAFETY
(Hazard Mitigation)

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PHASE 1: TRANSLATE TO EXECUTE (AWS A2.4)

Blueprint reading is a dynamic lock-and-key mechanic.
Parse the AWS symbol to unlock your torch.



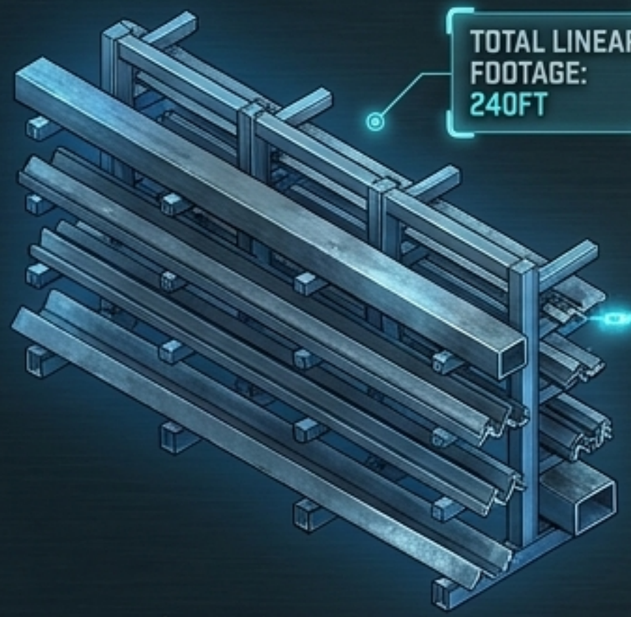
PLAYER LOADOUT

- PROCESS: MIG
  SELECTED
- WIRE: 0.035 SOLID
  SELECTED
- POSITION:
  2F HORIZONTAL FILLET
  SELECTED
  2F

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PHASE 2: CUT LIST OPTIMIZATION & SCRAP MITIGATION

RAW INVENTORY



SCRAP METER

CURRENT SCRAP: 22% (WARNING)

OPTIMIZATION ENGINE

CUT LIST

78%

STOCK #1 (120"): [TRAILER SIDE A (80")] [TRAILER SIDE B (SB")] [WASTE (2")]

STOCK #2 (80"): [CROSSMEMBER 1 (48")] [CROSSMEMBER 2 (10")] [WASTE (2")]

STOCK #2 (80"): [CROSSMEMBER 2 (48")] [CROSSMEMBER 2 (10")] [WASTE (2")]

STOCK #3 (30"): [TRAIKCRA 8 (40")] [TRAI1R A (30")] [WASTE (2")]

CUT LENGTHS

NESTING EFFICIENCY

78%

RESOURCE MANAGEMENT:

Optimize cut list to extract trailer components while minimizing waste.

THE SCRAP PENALTY:

Inefficient math increases the Scrap Meter, heavily penalizing the final Consistency Score to simulate real-world trip planning costs.

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PHASE 3: THE ARCHITECTURE OF SEQUENCING



STAGE 1:
BASE FRAME LAYOUT

STAGE 2:
AXLE & CROSS-MEMBERS

STAGE 3:
TOP RAIL INTEGRATION

LOCKED

SYSTEM LOCKOUT:
STRUCTURAL HIERARCHY
VIOLATED.
PHYSICAL ACCESS
BLOCKED.

The RTS engine physically locks players out of welding if the structural hierarchy is violated. Weld the wrong part first, and you block your own access.

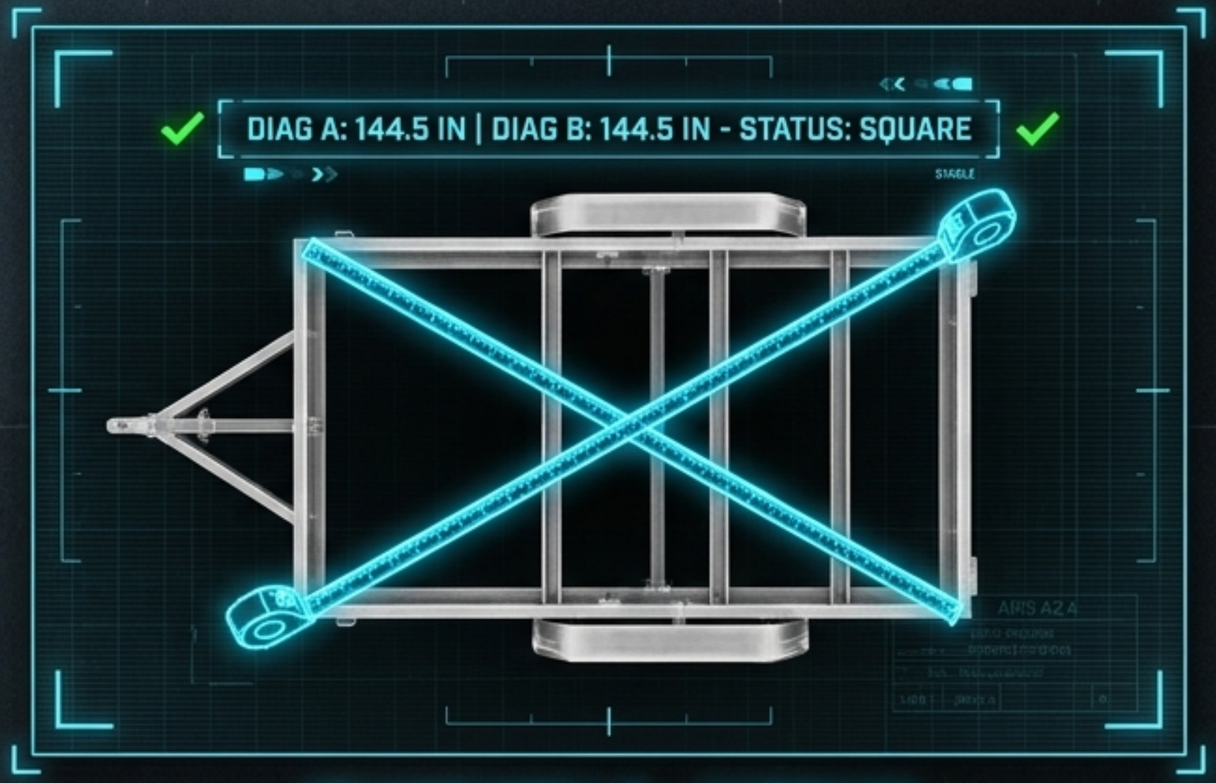
Gamers learn to see three steps ahead.

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PHASE 4: PRECISION BEFORE POWER (DIAGONAL FIT-UP)



TRANSITION 1 - WARPED

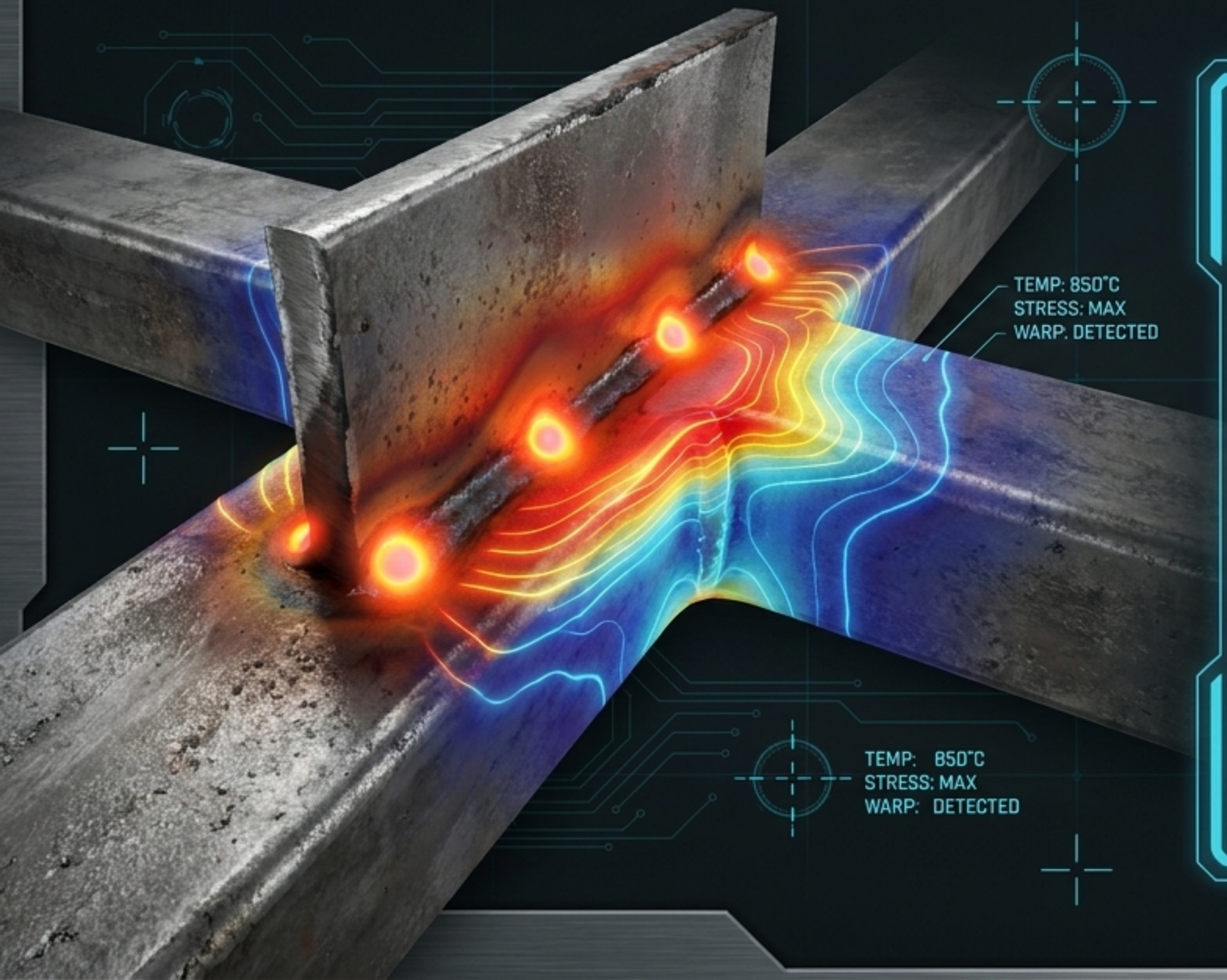


TRANSITION 2 - PERFECT

Before striking an arc, the frame must be mathematically square. The Diagonal Check mechanic forces players to physically pull digital tape measures corner-to-corner. Attempting to weld an unsquared frame results in an instant mission failure.

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PHASE 5: TACK WELDING RULES & THERMAL DISTORTION



RULE 1: TACK SIZING

Players must hold the puddle for exact durations. Tack length must equal material thickness.

RULE 2: STRATEGIC PLACEMENT

Tacks must be placed in alternating, opposing sequences to counteract the physics of heat distortion. Incorrect sequencing visibly warps the trailer inside the physics engine.

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THE ANALYTICS OF FABRICATION

$$XP = (Accuracy * 10) + (Consistency * 5) - (Defects * 50)$$

STABLE

ACCURACY (40%)

- BLUEPRINT ADHERENCE
- FIT-UP SQUARENESS

CONSISTENCY (30%)

- CUT LIST EFFICIENCY
- SEQUENCE PLANNING TIME

SAFETY (30%)

- FUME EXTRACTION UPTIME
- FIRE WATCH MANAGEMENT

THE DEFECT PENALTY

A massive -50 point deduction is applied for any porosity, undercut, or slag. A single mistake at the end ruins the entire piece. The algorithm conditions players to prioritize perfection over speed.

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ACCELERATED COGNITION: SIM VS. SHOP

THE SANDBOX ADVANTAGE

COMPARISON MATRIX	TRADITIONAL SHOP	GAME 11 SIM
1. COST OF MATERIAL FAILURE	High / Scrap Steel	$0 / Instant Reset ✓
2. REPS PER HOUR	1-2 assemblies	10+ assemblies ✓
3. FEEDBACK LOOP	Delayed, post-weld inspection	Immediate algorithmic visual feedback ✓
4. SAFETY RISK DURING LEARNING	High risk of burns/fumes	Zero risk sandbox ✓

Players master the mind of a fabricator in the digital sandbox, saving thousands of dollars in wasted shop steel and accelerating cognitive mastery.

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THE COGNITIVE LEAP

Translating Virtual Strategy to Physical Skill



Game 11 proves that the neural pathways required to manage an RTS base under fire are identical to the pathways required to sequence, fit, and weld a complex structural assembly. Gamers are latent master fabricators.

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Game 12: The Master Weld-Off (AWS D1.1 Live)

The Ultimate Test: A physical, live AWS D1.1 Limited Thickness 3/8in qualification test.

The Target: 10,000 XP (Platinum Expert Welder Tier). Zero defects.

The Outcome: Passing Game 11 means the student is cognitively primed. Passing Game 12 makes the gamer an industry-certified, job-ready fabricator.



Gemini Notebook