Webinar: The NCCCO Foundation Report on Virtual Reality's Role in Crane Operator Certification Testing

Presented by:

Graham Brent, CEO, NCCCO Foundation
Zack Parnell, CEO & President, ITI
Wallace Judd, PhD & CEO, Authentic Testing

NCCCO FOUNDATION

ITI VR SIMULATIONS

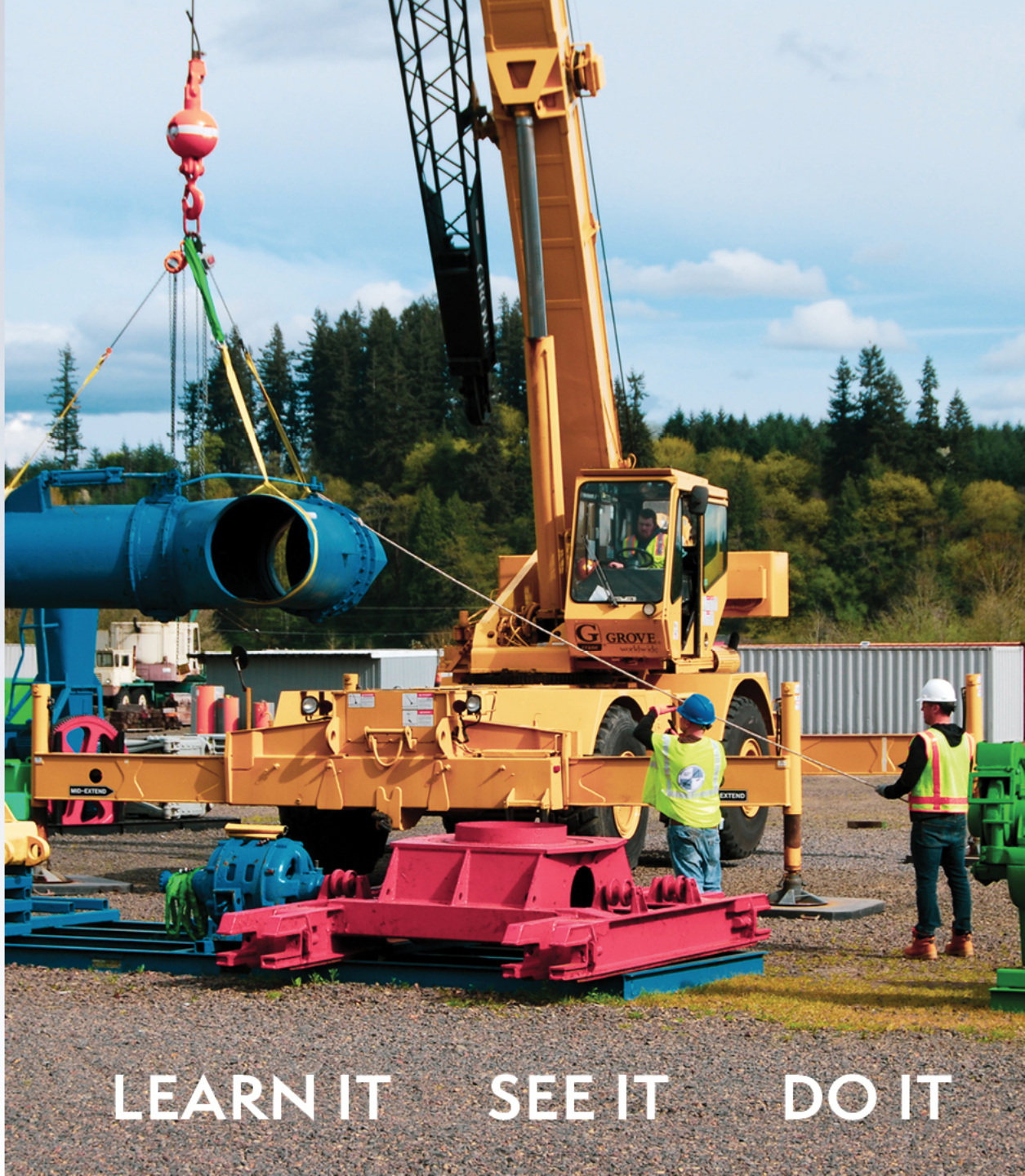
Authentic Testing®
The Gold Standard for Testing

ITI INDUSTRIAL TRAINING INTERNATIONAL

WHY ITI ?

'WE EXIST TO SERVE AND LEARN EVERYDAY'

- Training Centers
- Client Site Training
- VR Training Simulations
- Online Training



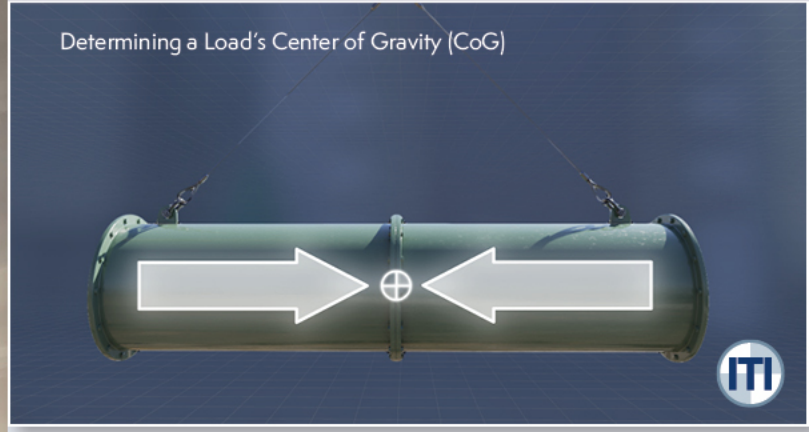
Relied upon by global industry leaders

4 GROWING COURSE LIBRARIES OF INDUSTRIAL TRAINING CONTENT:

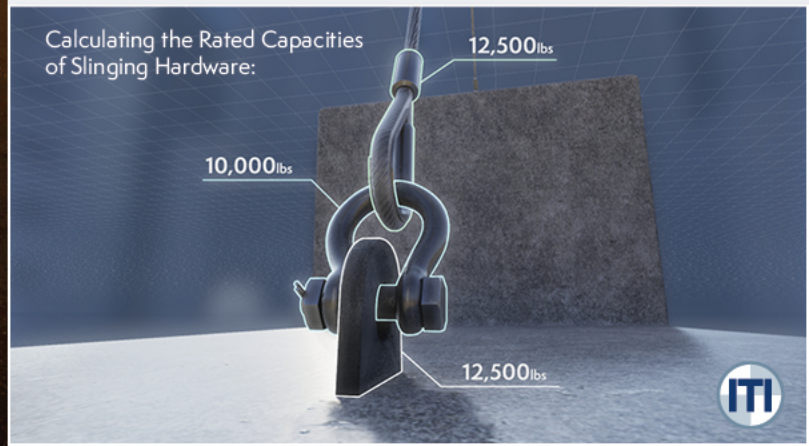
- Cranes & Slinging
- Industrial Safety
- Plant Maintenance
- Lift Planning Engineering

ITI ONLINE LEARNING

ON DEMAND COURSES TO LIFT YOU TO NEW HEIGHTS



- Use and Inspection of Common Rigging Equipment
- Safe Rigging Practices
- Performing Knots and Hitches
- Hand, voice, and other audible signals
- Determining center of gravity



ITI OperatorPro

*The application for **PROFESSIONAL** crane & equipment **OPERATORS***

Log **shifts, activities, configurations** and notes on 3,000+ equipment models

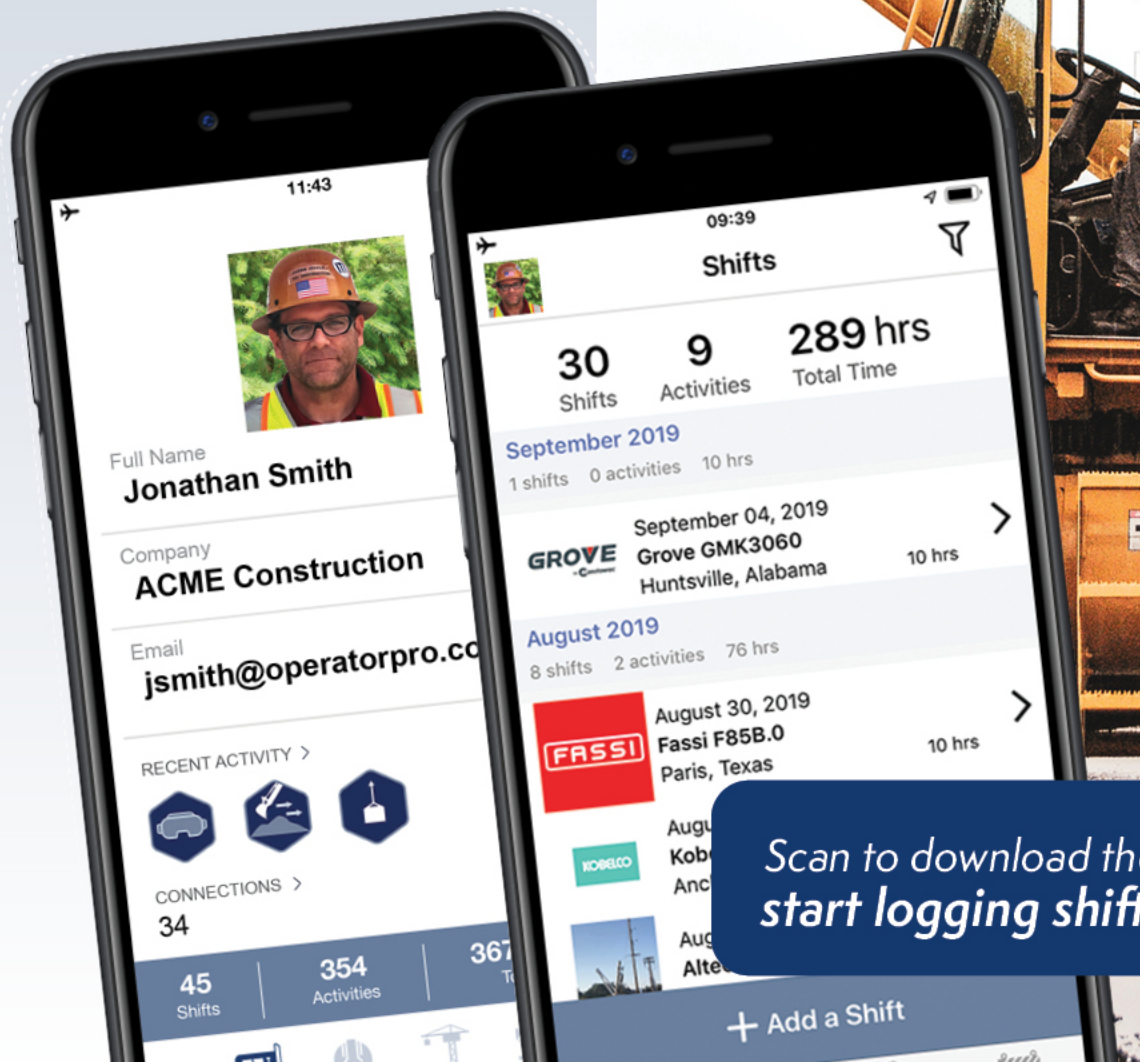
Request **evaluations** and keep detailed records of your results

Upload **photos, documents,** and other **records** in a single, easily accessible place

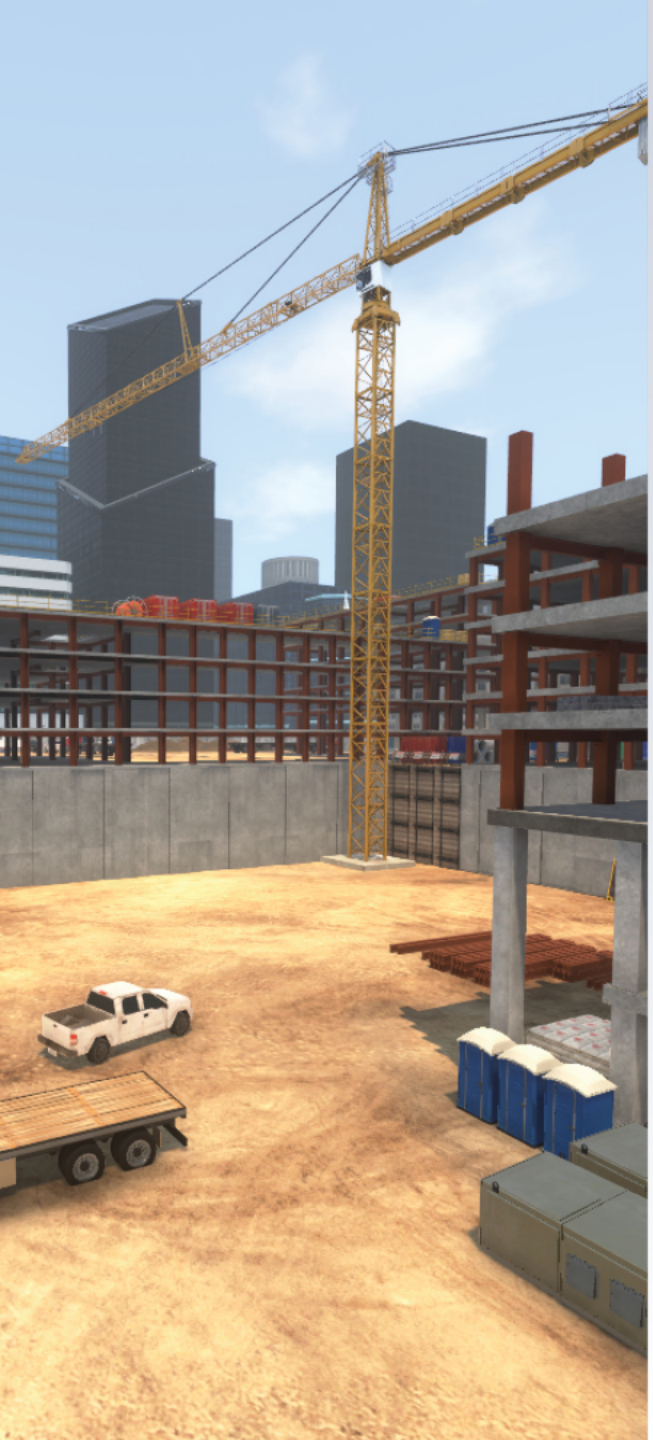
Download on the App Store

Get it on Google play

operatorpro.com



Scan to download the app and ***start logging shifts today!***



THE LARGEST AND MOST AUTHENTIC CRANE SIMULATION LIBRARY ON THE PLANET SOLVING CHALLENGES OF WORLD-CLASS ORGANIZATIONS

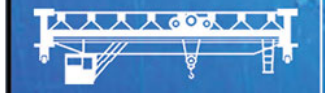
ITI VR + serious:labs® Seriously Engaging Training = ITI VR Powered By serious:labs

ITI VR
Powered By serious:labs

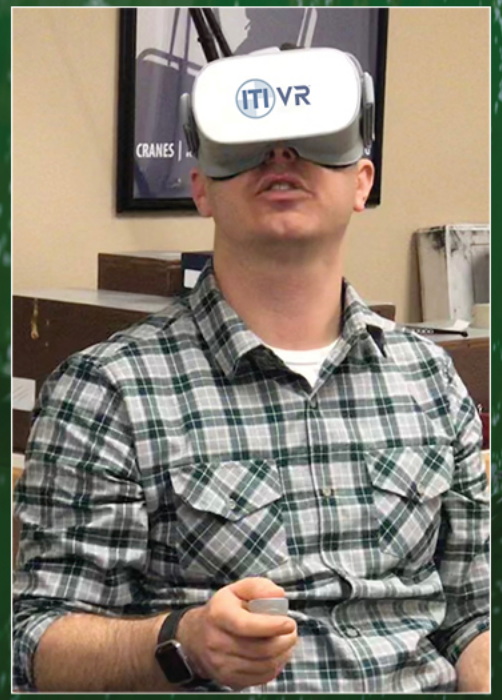
Crane Simulation Librar

VR AWARDS 2017 | AMD STUDIOS
BEST USE OF VR IN EDUCATION & TRAINING
2017 WINNER

ITI VR strives to create a one-to-one experience, something that only virtual reality can provide, and we can do so with the help of Original Equipment Manufacturers that ensure everything from our operator cab and joysticks to physical capabilities and constraints are 100% accurate.

OVERHEAD GANTRY CRANE	TOWER CRANE	LATTICE BOOM CRAWLER	ROUGH TERRAIN CRANE	ROUGH TERRAIN CRANE	BOOM TRUCK CRANE	CARRY DECK CRANE	HEAVY LIFT CRAWLER
							
CAB or REMOTE OPERATED	LIEBHERR 550-EC-H	LINK-BELT 218 HSL	TADANO GR-1000XL	BRODERSON RT 400	TEREX BT-28106	BRODERSON IC 80	LIEBHERR LR 1300

LIEBHERR
BMC BRODERSON Manufacturing Corp.
Link-Belt CRANES
TADANO
TEREX



Quickly assess and evaluate individual working knowledge of construction site safety.

CONSTRUCTION HAZARD ID

POWERED BY ITI VR

INTERMEDIATE RIGGING
April 8, 9:00-5:30 EST

Instructor
Mike Goett, Edmonton

Register | $390

MASTER RIGGER
April 9, 9:00-5:30 EST

Instructor
Mike Goett, Edmonton

Register | $790

LIFT DIRECTOR/CRITICAL LIFT PLANNING
April 9-10, 9:00-5:30 EST

Instructor
Jim Cox, Woodland,WA

Register | $890

ITI REMOTE LEARNING OPPORTUNITIES

KEEP YOUR TEAM'S SAFETY AND HEALTH AT THE FOREFRONT

Live Instructor-Led Training Course Webinars

ITI Online Crane & Rigging Course Library

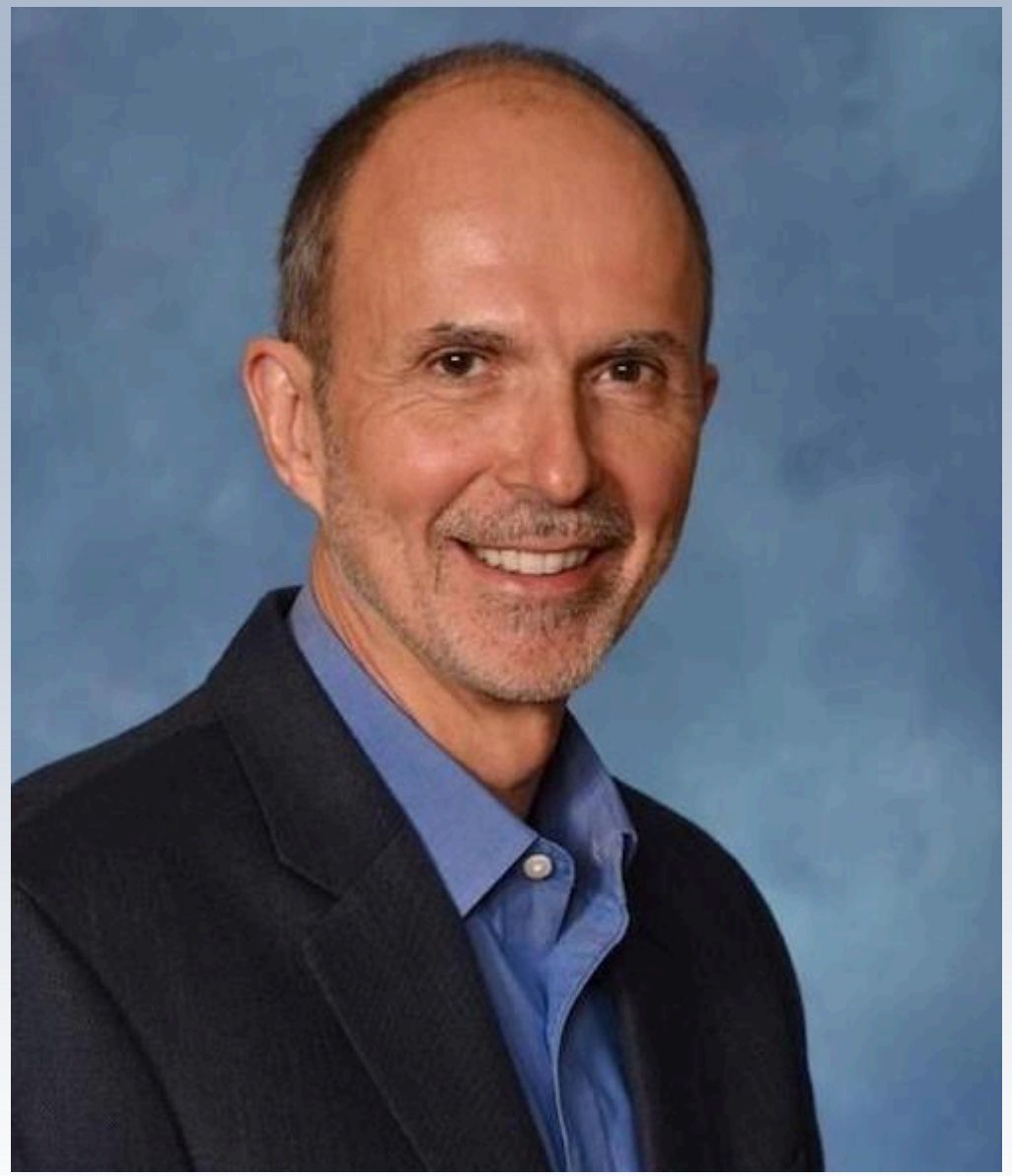
Dedicated Live Webinar

Graham Brent • 1st
Chief Executive Officer at NCCCO Foundation
1h •

Virtual Reality has established itself as a major asset in the training toolbox. Now it comes to certification testing. Or does it?

NCCCO Foundation
335 followers
1h •

Could Virtual Reality technology replace cranes in certification testing? A brand new study from the NCCCO Foundation sheds some light on the question.



Graham Brent

- CEO, NCCCO Foundation
- Founding CEO, NCCCO

ConExpo 2017

Study1: WCT

ITI

Washington
Oregon
Montana
North Dakota
Minnesota
Idaho
Wyoming
South Dakota
Wisconsin
Nevada
Utah
Colorado
Nebraska
Kansas
Arizona
New Mexico
Oklahoma
Texas
Alaska
Hawaii
Florida

New Hampshire
Vermont
Massachusetts
Maine

Study 1 & 2: ITI TX

VR Crane Simulations

Wallace Judd, Ph.D.

- Princeton BA
- Harvard MS
- Stanford Ph.D.
- Xerox PARC Engineer
- Apple Engineer
- ANSI Assessor
- World-leading expert in performance testing.

Introducing our candidates

Age		
18-24	2	5%
25-34	13	33%
35-44	11	28%
45-54	8	20%
55-64	4	10%
65+	1	3%
NA	1	3%
Total	40	100%

Introducing our candidates

Years		
>=	<=	N
	0	9
1	3	11
4	5	5
6	10	5
11	20	7
21	20+	3
	Total	40

Introducing our candidates

Crane Experience		
>=	<=	N
	0	9
1	100	4
101	200	3
201	500	5
501	1,000	3
1,001	10,000	14
10,001	30,000	2
	Total	40

Cranes Used:

Tadano

Cranes Used:

Link-Belt

Cranes Used:

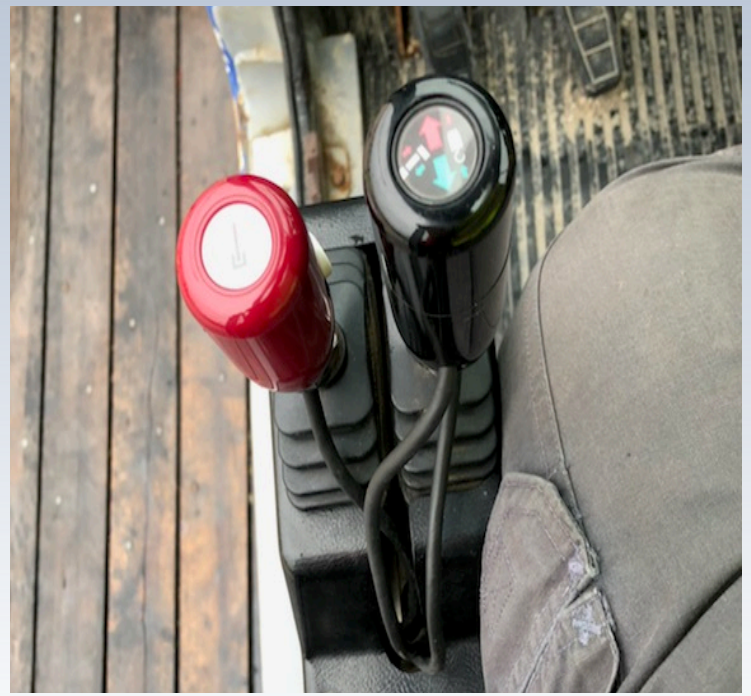
Broderson

Virtual Crane Controls:

Tadano

Actual Controls

Virtual Crane Controls



Virtual Crane View

Test Course

- Initial Walkaround
- Ball in Barrel
- Ball in Stop Circle
- Hand Signals
- Maze Forward
- Maze Backward
- Shutdown Procedure

Previous Study – 2018:

Featuring 43 Participant Sets of Data

Crane1, VR1, Crane2, VR2, All Candidates

Crane Test:	Retest Score Correlation: 0.88
	Retest Pass/Fail Agreement: 0.83
VR Test:	Retest Score Correlation: 0.69
	Retest Pass/Fail Agreement: 0.72

Previous Study Issues:

Different

- Cranes
- Locations
- VR Practice
- VR and Actual Cranes

Measure Classification Accuracy

Raw data
- 53 Candidates

Classification Accuracy =
(10 + 20) / (40) = 30 / 40 = **75%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	10	5
	Fail	5	20

Final Results - Previous Study

All Candidates –

- Initial Classification Accuracy: 35%
- Limit to 10 ITITX Candidates
- Use AI To Factor the Domains
- Classification Accuracy: 95%

New Study Design:

All Candidates -

- Initial Classification Accuracy: 35%
- Limit to 10 ITITX Candidates
- Use AI To Factor the Domains
- Classification Accuracy: 95%

Second Study - 2019

Raw
- 53 Candidates

Classification Accuracy = P_0 =
(19 + 22) / (All) = **0.77**

Decision Consistency =
19 / (19 + 8) = 19 / 27 = **70%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	19	8
	Fail	4	22

Second Study - 2019

After Initial Adjustment
- 53 Candidates

Classification Accuracy = P_0 =
(19 + 25) / (All) = **0.83**

Decision Consistency =
19 / (19 + 5) = 19 / 24 = **79%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	19	5
	Fail	4	25

Second Study - 2019

AI Refactoring
- 53 Candidates

Classification Accuracy = P_0 =
(17 + 28) / (All) = **0.85**

Decision Consistency =
17 / (17 + 2) = 17 / 19 = **85%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	17	2
	Fail	6	28

Second Study - 2019

AI Refactoring
- 52 Candidates

Classification Accuracy = P_0 =
(17 + 28) / (All) = **0.87**

Decision Consistency =
17 / (17 + 1) = 17 / 18 = **94%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	17	1
	Fail	6	28

Observations:

- We now have decision consistency of 94% for the study.
- Decision consistency = 1 - Type 1 Error
- In the 2018 Study, the Test – Retest Score Reliability was 0.88
- 2018 Study: Retest Pass/Fail Agreement: 0.83

Second Study - 2019

AI Refactoring
- 52 Candidates

Classification Accuracy = P_0 =
(17 + 28) / (All) = **0.87**

Decision Consistency =
17 / (17 + 1) = 17 / 18 = **94%**

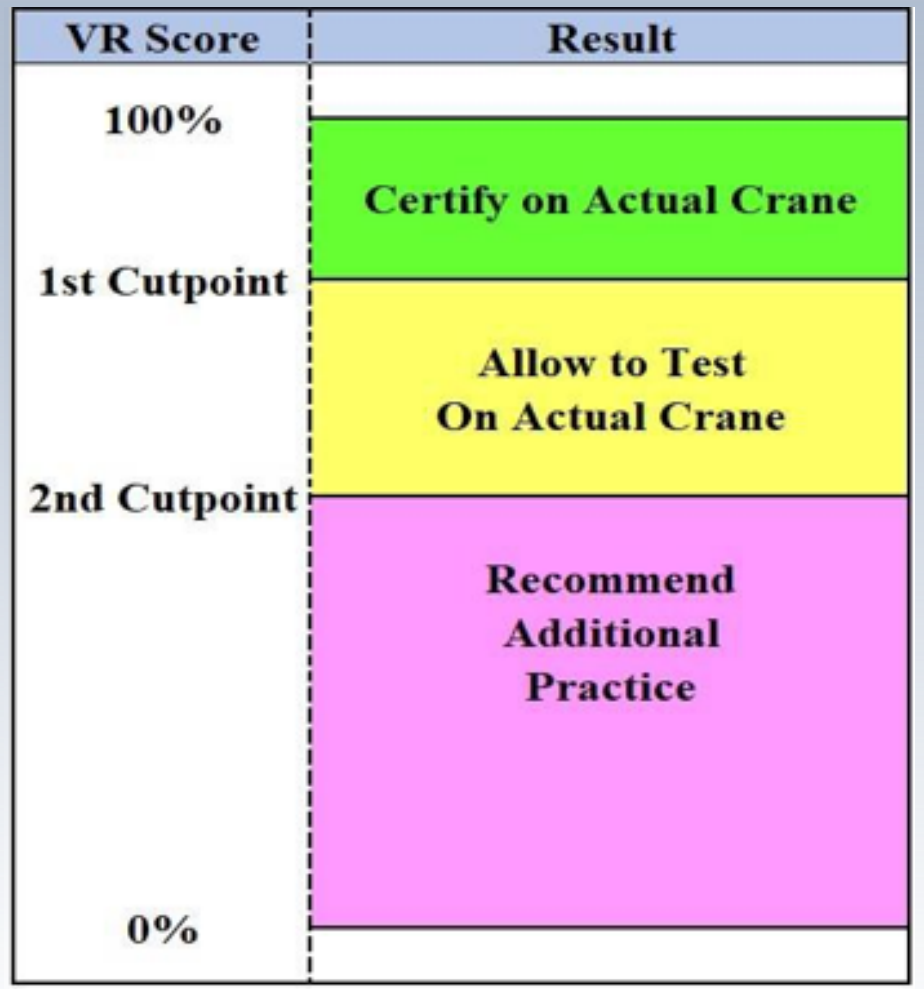
2018: Pass/Fail Agree = **83%**

		Original Data	
		Crane	
		Pass	Fail
VR	Pass	17	1
	Fail	6	28

Recommendations:

- Require at least 45 minutes VR practice prior to the VR test.
- Require & verify adequate crane experience.
- If a candidate fails the VR, offer a discounted Crane test
- Keep data on failed VR tests and follow-up Crane tests.
- The Crane test is an ADA accommodation for the VR test.

Recommendations:



Questions?