

Hale

MR I



Michigan Wheel Marine 

M E A S U R E M E N T **R** E C O R D I N G **I** N S T R U M E N T

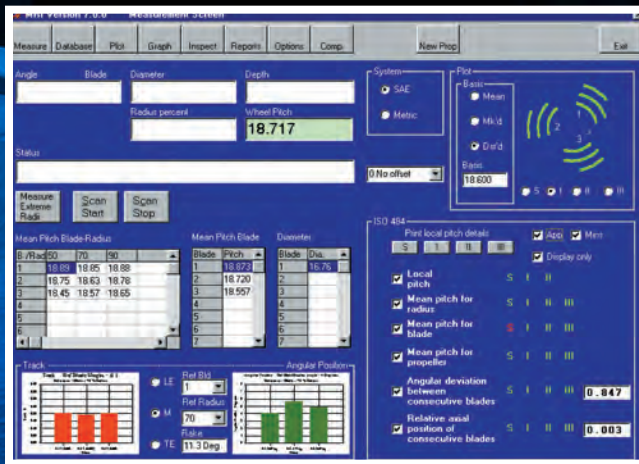
Advanced Technology in Electronic 3-D Propeller Analysis

Experienced propeller repair facilities prefer the Hale MRI for performing detailed and accurate propeller measurement. With the MRI's comprehensive reporting capability, the propeller technician can record and document the exact condition of a customer's propeller. The resulting concise and visual summary can assist customers in determining the optimal repair or reconditioning service best suited for their needs.

MRI Features Include:

- Compatibility with Windows 7.
- Durable rotary and linear encoders that provide continuous and highly accurate 3D readings to the computer for analysis and recording.
- Measurements and reporting of **Pitch, Rake, Track, Angular Spacing, Section Face Camber, and other geometric features for ANY propeller.**
- Ability to compare one propeller to another, such as left hand vs. right hand rotation, or two of the same rotation. This allows for the exact matching of a propeller set.
- Permanent computer record of pre and post repair activities, which can be transferred to another MRI user via e-mail or data storage devices. With this information, any MRI user has the necessary details to provide a subsequent repair or recondition service resulting in a finished propeller closely matching the original. If replacement is necessary, the detailed dimensional information can be supplied to the propeller manufacturer for review and determination of an optimal new propeller.

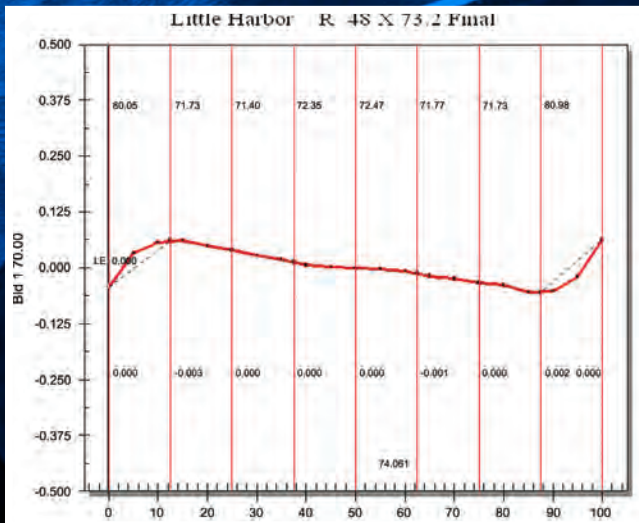
The Hale MRI is distributed by Michigan Wheel Marine, with technical support provided by Michigan Wheel and Hale Propeller. Units are supplied with stand, table, arbors, measurement arm, computer and computer monitor. On site set-up and training is typically available. The base model is the HP-50, designed for measuring 10" through 50" diameter propellers. Larger and smaller units are available on a custom order basis. Units capable of measuring propellers up to 150" in diameter have been built and are being successfully used today.



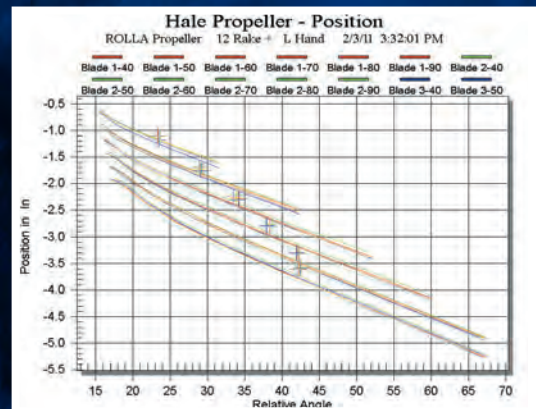
Measurement Screen - Combines all MRI screens into one "easy to read" screen. Provides a quick reference for the technician during the repair or modification process.



Plot Screen - As the propeller is being scanned, dynamically display results for each measured blade radius. The resulting color coded map provides the technician with an overall view of how the propeller geometry conforms to the specified tolerance, what blade sections are out of tolerance, and by how much.



Comparison Graph - Compares actual pitch of propeller against manufacturer's designed pitch. Black line is designed pitch. Red line is what propeller shows as actual pitch.



Position Screen - Check rake and track from blade to blade.

Michigan Wheel completed propeller MRI inspection report.



Federal 32 L 48 CX-400 9/24/09

Customer
Bore

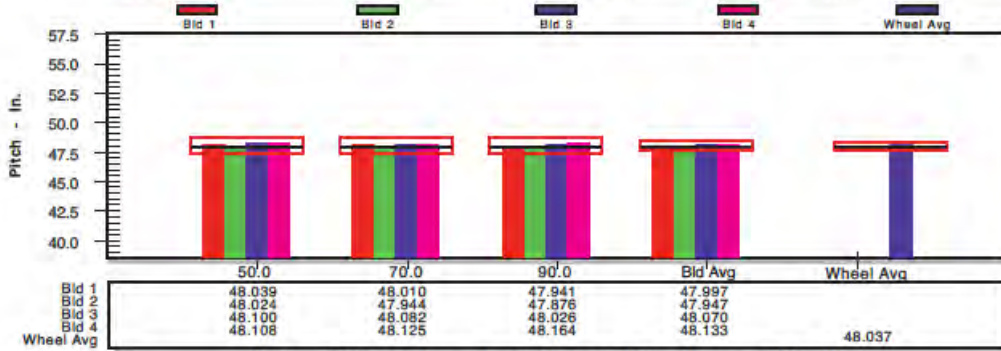
Michigan Wheel Advanced Prototype
2 3/4

Part Number
Material

355997
NiBrAl

Serial Number
Cupping

64285
6 - .089



Local Pitch: LE< >TE

Pitch per Blade at Radius - Average Pitch per Blade - Average Pitch for Wheel

r/R	Blade 1			Blade 2			Blade 3			Blade 4		
50.0%	48.27	47.94	47.91	48.32	47.87	47.88	48.19	48.05	48.05	48.31	48.06	47.95
70.0%	48.16	47.98	47.90	48.02	47.90	47.92	48.22	48.00	48.03	48.29	48.08	48.01
90.0%	48.05	47.95	47.83	47.93	47.93	47.77	47.96	48.08	48.04	48.21	48.10	48.18

Radius / Diameter - Track - Chord

Blade	Rad. / Dia.	Track	50.0 % Rad.	70.0 % Rad.	90.0 % rad.
1	16.02 / 32.03	0.000	14.02	16.24	12.09
2	16.05 / 32.09	-0.018	14.03	16.29	12.08
3	16.05 / 32.10	-0.022	14.09	16.29	12.20
4	16.04 / 32.07	-0.030	14.10	16.30	12.26

Tolerance List Basis = 48 In Diameter = 32 In

Radius	0.3 %	+/- 0.05 in	16.0 / 15.95 in
Local Pitch	2 %	+/- 0.96 in	48.96 / 47.04
Section Pitch	1.5 %	+/- 0.72 in	48.72 / 47.28 in
Blade Avg. Pitch	1 %	+/- 0.48 in	48.48 / 47.52 in
Prop Avg. Pitch	0.75 %	+/- 0.36 in	48.36 / 47.64 in
Track		0.32 in	

ACCEPTABLE	YES	NO
Blade Surface		
Blade Edges		
Balance		
Thickness		
Bore/Key		
Exceptions		
Approval		Date

Why Select an MRI Shop?

- The MRI shops are staffed by propeller repair professionals, with years of technical experience performing propeller modifications and repairs.
- The MRI is a precise instrument that provides the shop with accurate information to enhance their repair capability.
- After a successful repair using the MRI, a detailed report of the final propeller condition can be generated by the technician. Both the shop and the boat owner will then have a clear and documented standard for future reference.
- Once desired propeller performance is obtained, future propeller repair or manufacture can be matched to this propeller geometry stored in the MRI database.
- For full custom propellers with sophisticated blade geometry, accurate measurements with the precision MRI system are necessary to implement repairs resulting in full agreement to design geometry. The MRI system can import and utilize in comparison measurements the original design data supplied by the propeller manufacturer. The MRI can also refer and compare to the original inspection reports typically supplied with full custom propellers.
- On both custom and standard series propellers, the MRI provides information which the propeller shop and customer can use to evaluate and address performance issues.

Properly restored, or correct propellers, can:

- ✿ Synchronize Propeller Loading
- ✿ Improve Speed and Fuel Economy
- ✿ Minimize Vibration and Noise

For further detail and a listing of users for the Hale MRI units, visit www.halepropeller.com, or www.miwheel.com.

For pricing and availability, contact Michigan Wheel Marine.



Michigan Wheel Marine

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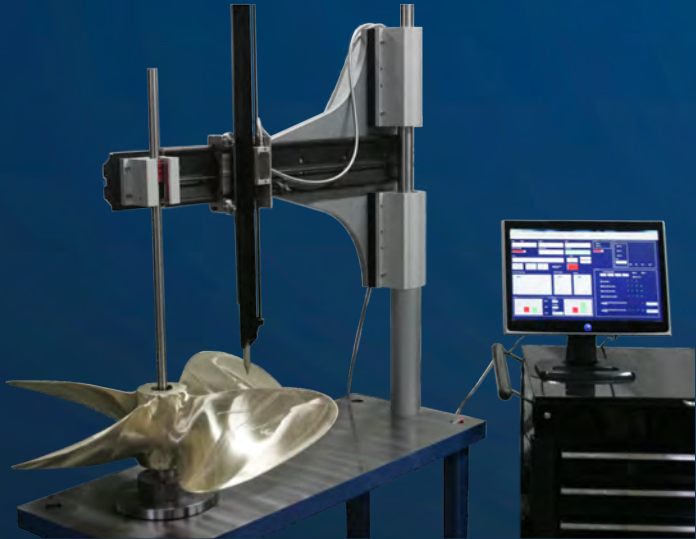
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No Matter where you are, there is a Hale MRI shop near you.



MRI HP- 50



MRI HP-100

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