

EFFECTIVE AIRFIELD MARKINGS

ICAO REGIONAL WORKSHOP
On Air Navigation Visual Aids –
Airfield Markings and Lighting Systems
6 to 8 July 2015

Donna Speidel, Sightline

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How to Properly Place a Marking

- ➔ Application Procedures – Best Practices
- ➔ Field Training and Calibration
- ➔ Inspection and Quality Control



Application Procedures

Binder Application

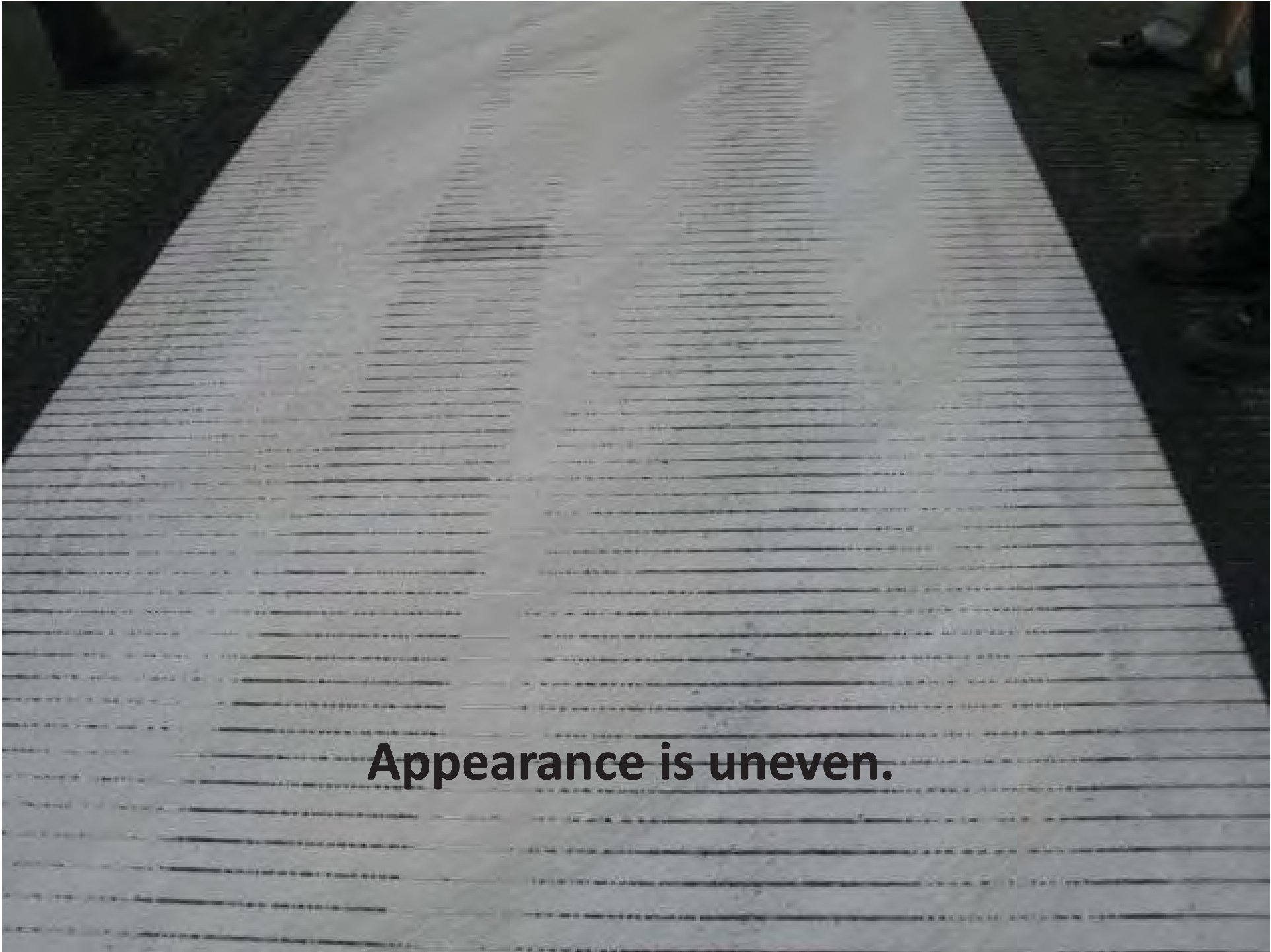
A 15 mil (380 μ m) wet film thickness should be uniformly applied.



figure 6-48. Irregular film thickness across the line performs poorly.







Appearance is uneven.

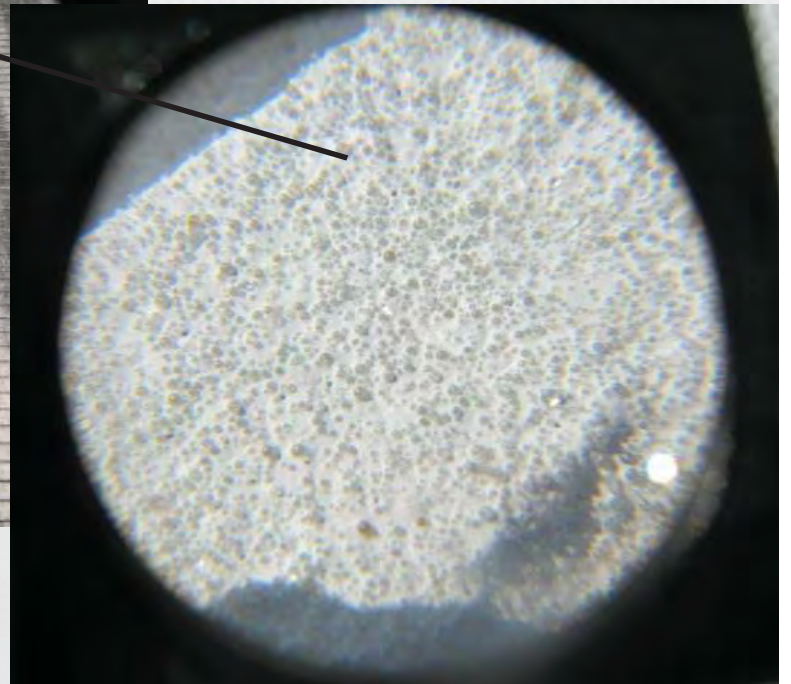
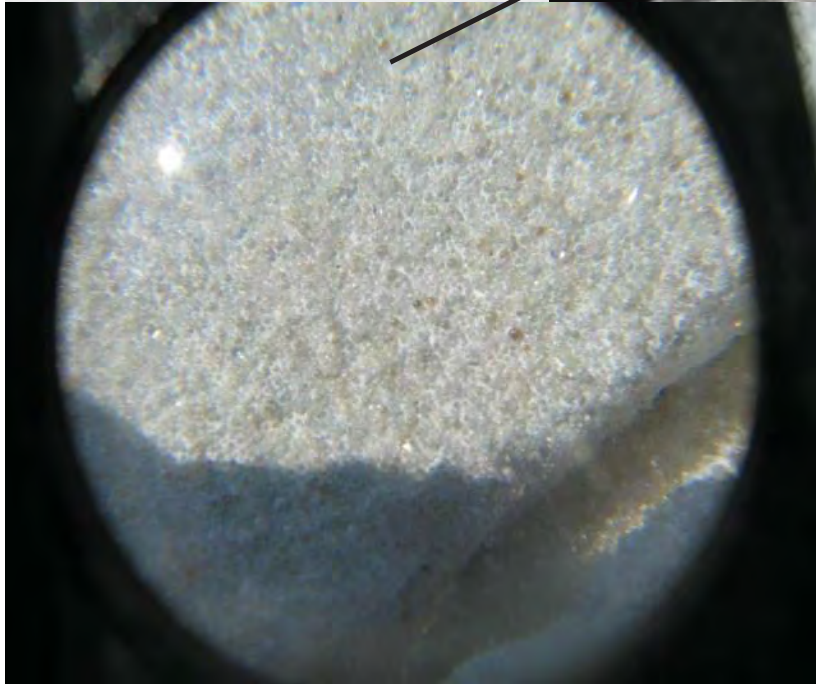


Appearance is uneven.

Nighttime visibility is good . . .
. . . but the glass beads are uneven.

1100 mcd

800 mcd













“Since striated markings have a reduced visibility, more frequent maintenance is required to provide an acceptable marking system. Striated markings are not used on Category II and Category III precision runways.”

Source: FAA AC 150/5340-1J

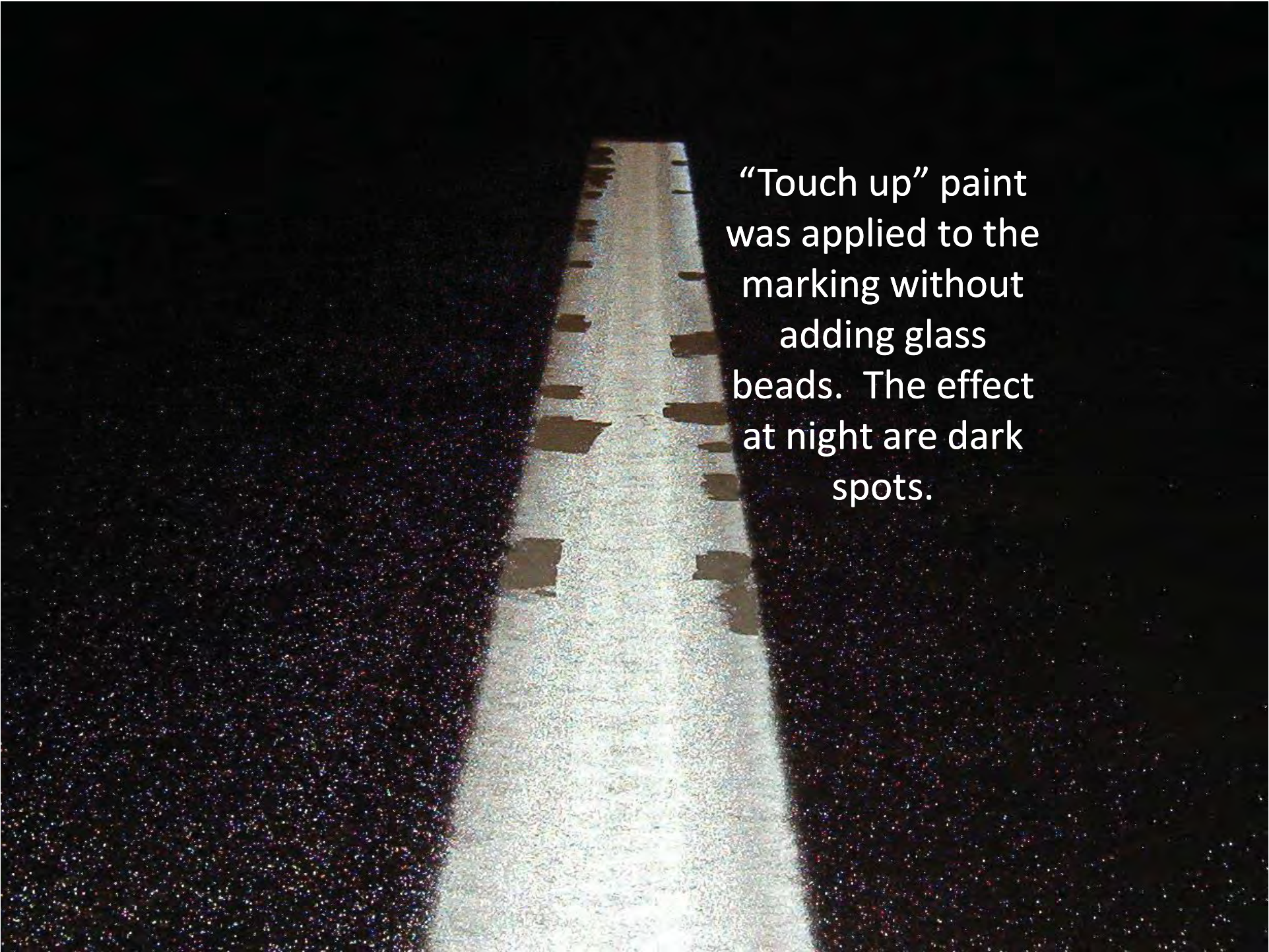






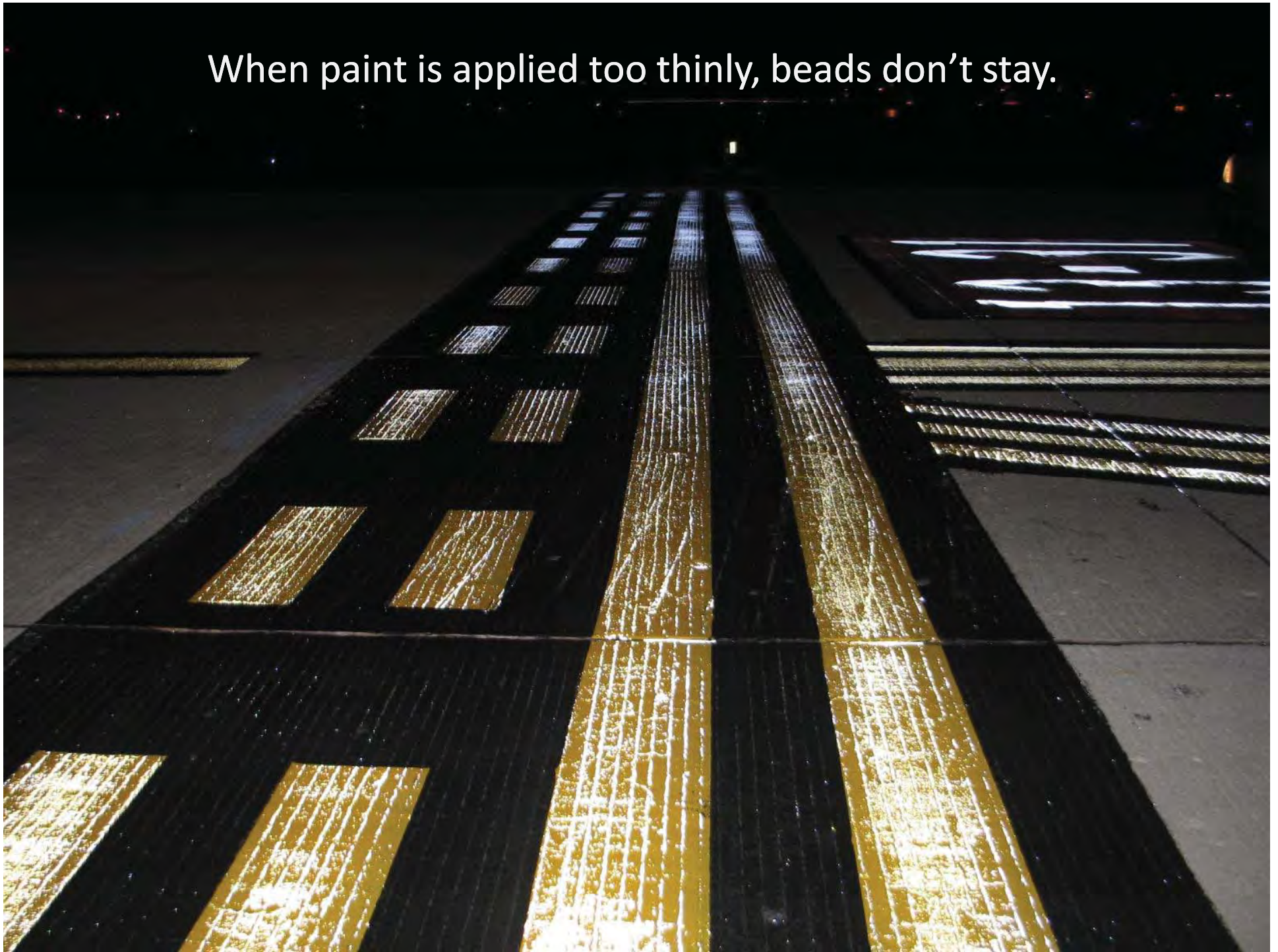
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“Touch up” paint
was applied to the
marking without
adding glass
beads. The effect
at night are dark
spots.

When paint is applied too thinly, beads don't stay.



Alignment and Dimension Tolerances


FAA: AC 150/5370-10G, Item P-620

620-3.5 APPLICATION. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Engineer.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m) and marking dimensions and spacings shall be within the following tolerances:

Dimension and Spacing	Tolerance
36 inches (910 mm) or less	+/- 1/2 inch (12 mm)
greater than 36 inches to 6 feet (910 mm to 1.85 m)	+/- 1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	+/- 2 inches (51 mm)
greater than 60 feet (18.3 m)	+/- 3 inches (76 mm)





“It’s not my job”
award for 2014



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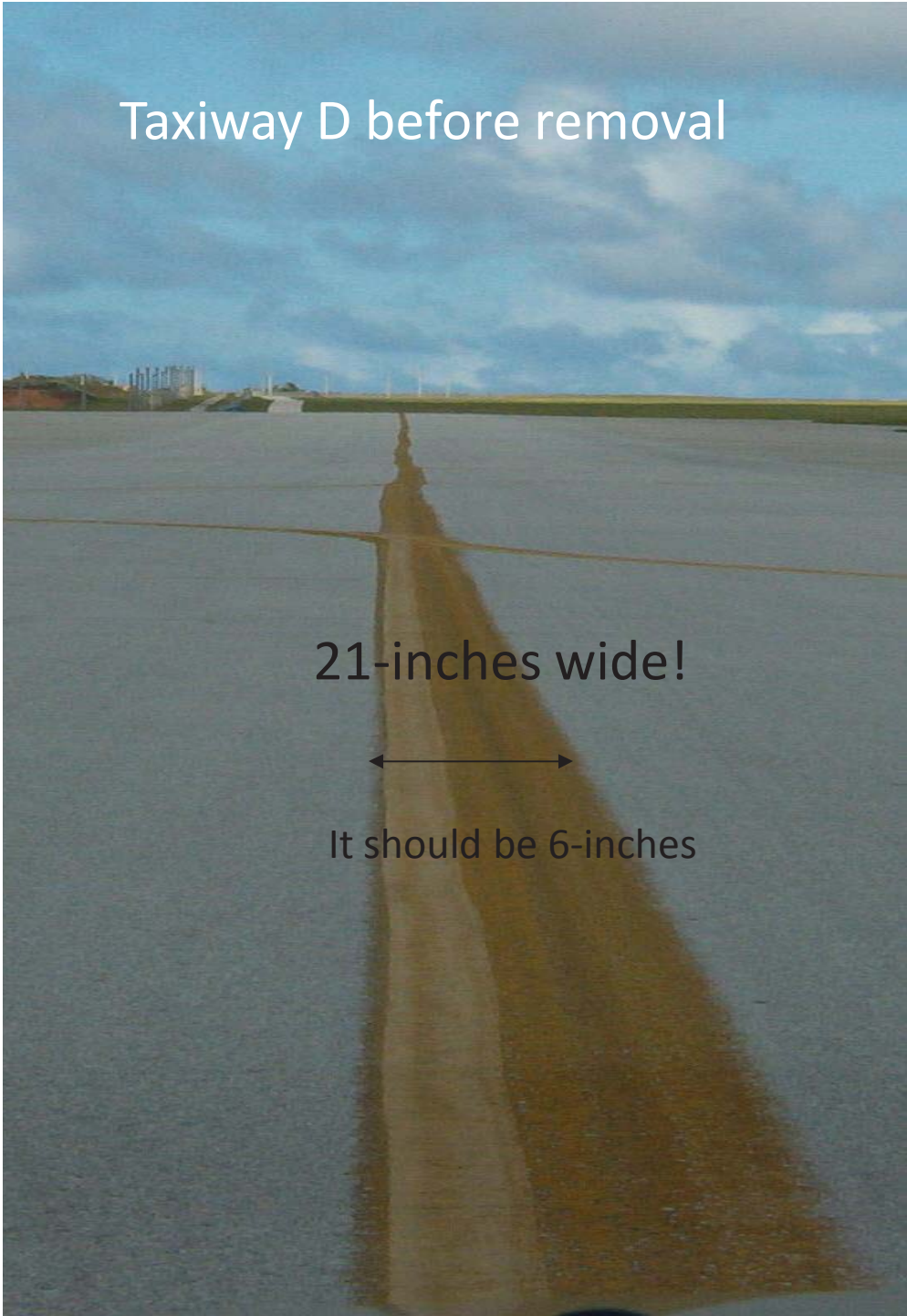




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Taxiway D before removal

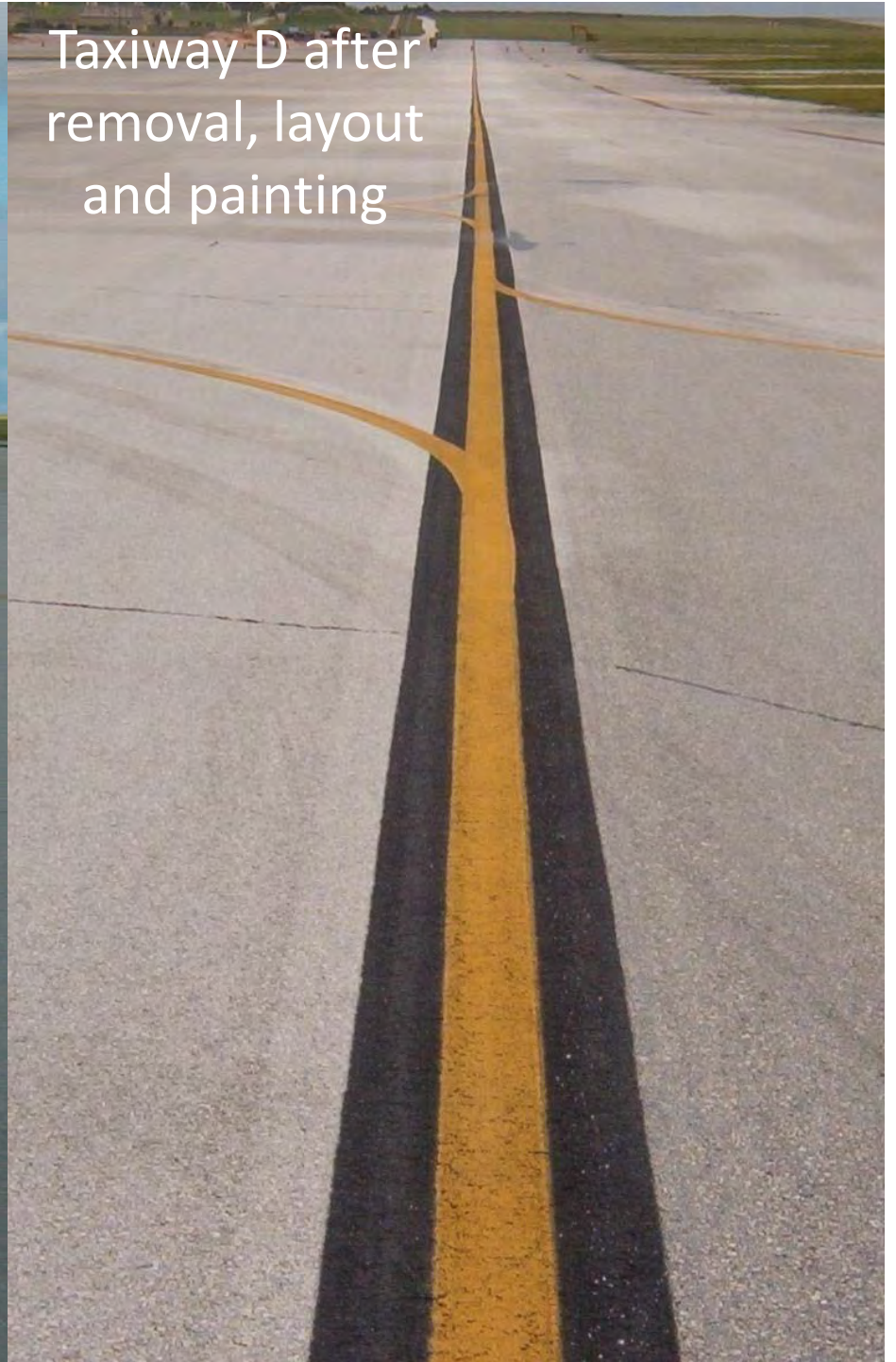


21-inches wide!



It should be 6-inches

Taxiway D after removal, layout and painting



The practice of repainting markings is passed down from applicator to applicator, similar to how tribal knowledge is conveyed.

Good judgment comes from experience, and experience ~ well, that comes from poor judgment.



Application Procedures – Best Practices

- Markings are applied from 15 cm to 90 cm in a uniform film thickness in a single pass.
- Two or more colors are applied simultaneously.
- Glass beads are dispensed automatically with the coating for both truck-mounted and hand-operated machines.
- Windscreens are used to prevent material displacement.
- A primer coat is applied to uncoated asphalt.
- Calibration of material guns is performed.
- Close attention is paid to application rates.
- Uniform, specified film thickness across marking.



FIELD TRAINING and CALIBRATION



Before Training



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After Training



Inspection – Chapter 7

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.
- ✓ Detail calibration techniques.
- ✓ Describe material usage techniques.
- ✓ Documentation criteria.
- ✓ Document with nighttime pictures.



Inspection

Develop a checklist for inspection.

- Provide experienced/trained inspector.
- Verify material type and quantities.
- Oversee calibration of equipment and verify material usage.
- Check layout for alignment and dimension.
- Ensure adequate surface preparation and/or paint removal.
- Require documentation.



Inspection – IPRF Requirements

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.



Tools to Evaluate Markings (Tool Kit)

- Wet Film Gauge
- Bead Gun Calibration Bucket
- Magnifying Lens
- Color Chips and/or Colorimeter
- LTL Reflectometer
- Flashlight
- Duct tape
- Metal coupons





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Inspection

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.
- ✓ Detail calibration techniques.





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AIRPORT BEAD CALIBRATION BUCKET

DROP RATE FOR 15 MIL (380 MICRON) WET FILM
BEAD VOLUME IN MILLILITERS PER 10 SECONDS FOR A 6" (15.24 CM) WIDE LINE

TTB-1325D, TYPE I BEAD CALIBRATION CHART

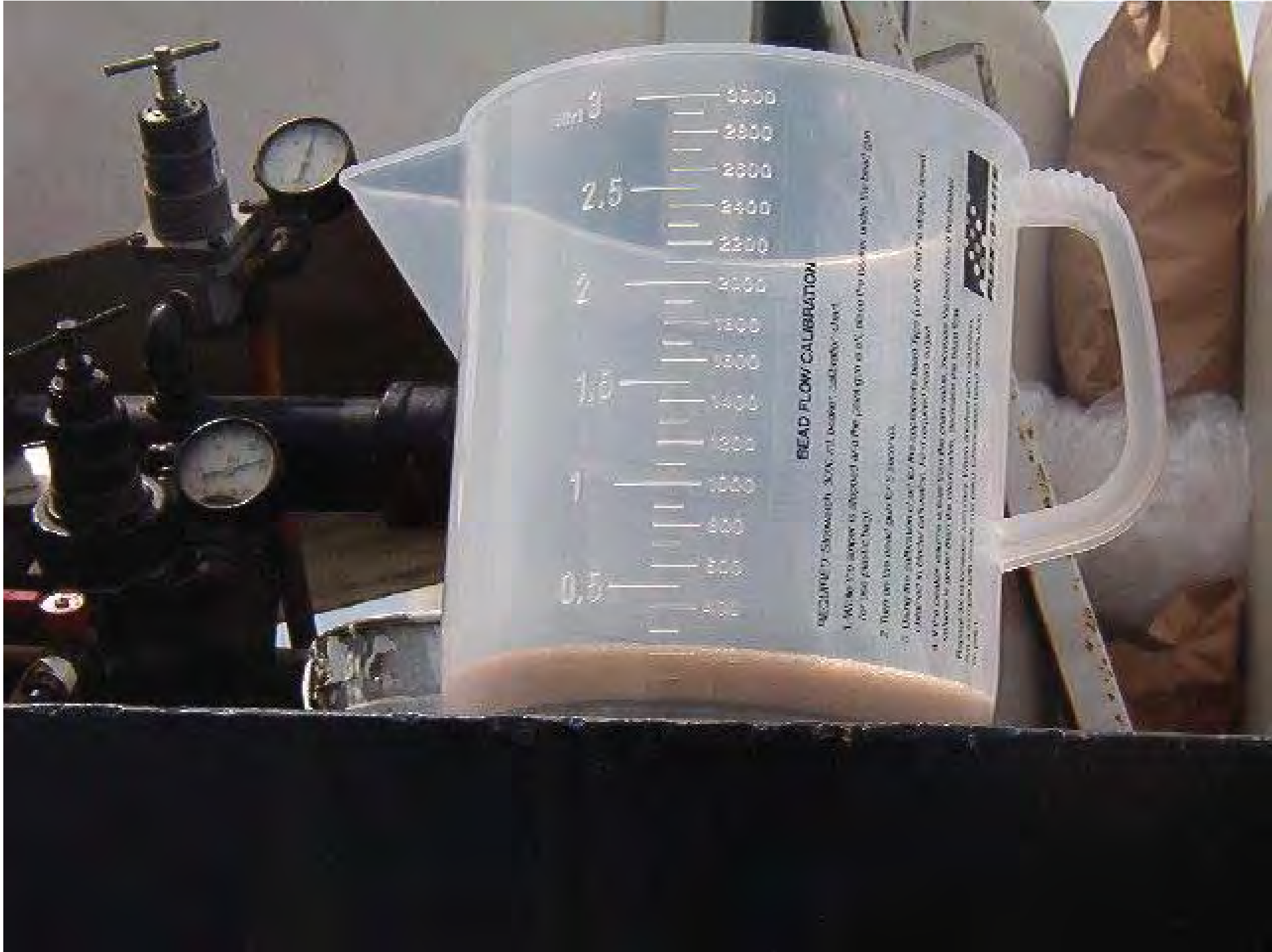
	7#/GAL	8#/GAL	10#/GAL	12#/GAL
7 MPH	980	1120	1400	1680
6 MPH	840	960	1200	1440
5 MPH	700	800	1000	1200
4 MPH	560	640	800	960
3 MPH	420	480	600	720
2 MPH	280	320	400	480

TTB-1325D, TYPE III BEAD CALIBRATION CHART

	7#/GAL	8#/GAL	10#/GAL	12#/GAL
7 MPH	560	645	807	969
6 MPH	480	555	693	831
5 MPH	400	462	576	693
4 MPH	320	369	462	555
3 MPH	240	276	345	414
2 MPH	160	186	231	276







READ FLOW CALIBRATION

1. Make the water is stopped and the flow is at 0, then the display will show 0.00
2. Then set the flow to 1.00
3. Check the calibration of the flow meter by using the known volume of water and the volume of water in the container. Also, check the flow rate.
4. If the volume of water is not the same as the volume of water in the container, then the flow meter is not accurate. You can adjust the flow meter by using the flow rate.





Before equipment calibration



Test line applied after calibration.



Inspection

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.
- ✓ Detail calibration techniques.
- ✓ Describe material usage techniques.



Inspection – Material Usage

1. Count initial material inventory and requantify each day.
2. Compute quantity (square footage/meter).
3. Divide SF/SM by gallons/liters of paint used.
4. Divide pounds of beads used by gallons/liters of paint used.



Inspection – Material Usage

11,500 SF or 1070 SM paint installed
100 gallons or 378 liters of paint used
1000 pounds or 453 kg of Type III glass beads used.

$11,500/100 = 115$ SF/gal or

1070 SM/ 378 l = 2.8 SM/l

1000 pounds/ 100 gallons = 10 #/gal.

453 kg/ 378 l = 1.2 kg/l



Inspection – Chapter 7

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.
- ✓ Detail calibration techniques.
- ✓ Describe material usage techniques.
- ✓ Documentation criteria.



Inspection – Documentation

1. What work was accomplished (quantity)
2. Where work was performed.
3. Who performed the work.
4. How work was performed (equipment used).
5. When work was performed (date/time).
6. Weather conditions.
7. Quality control measures taken.



Inspection – Chapter 7

- ✓ Develop a checklist for inspection.
- ✓ Develop a tool kit for inspectors.
- ✓ Detail calibration techniques.
- ✓ Describe material usage techniques.
- ✓ Documentation criteria.
- ✓ Document with nighttime pictures.

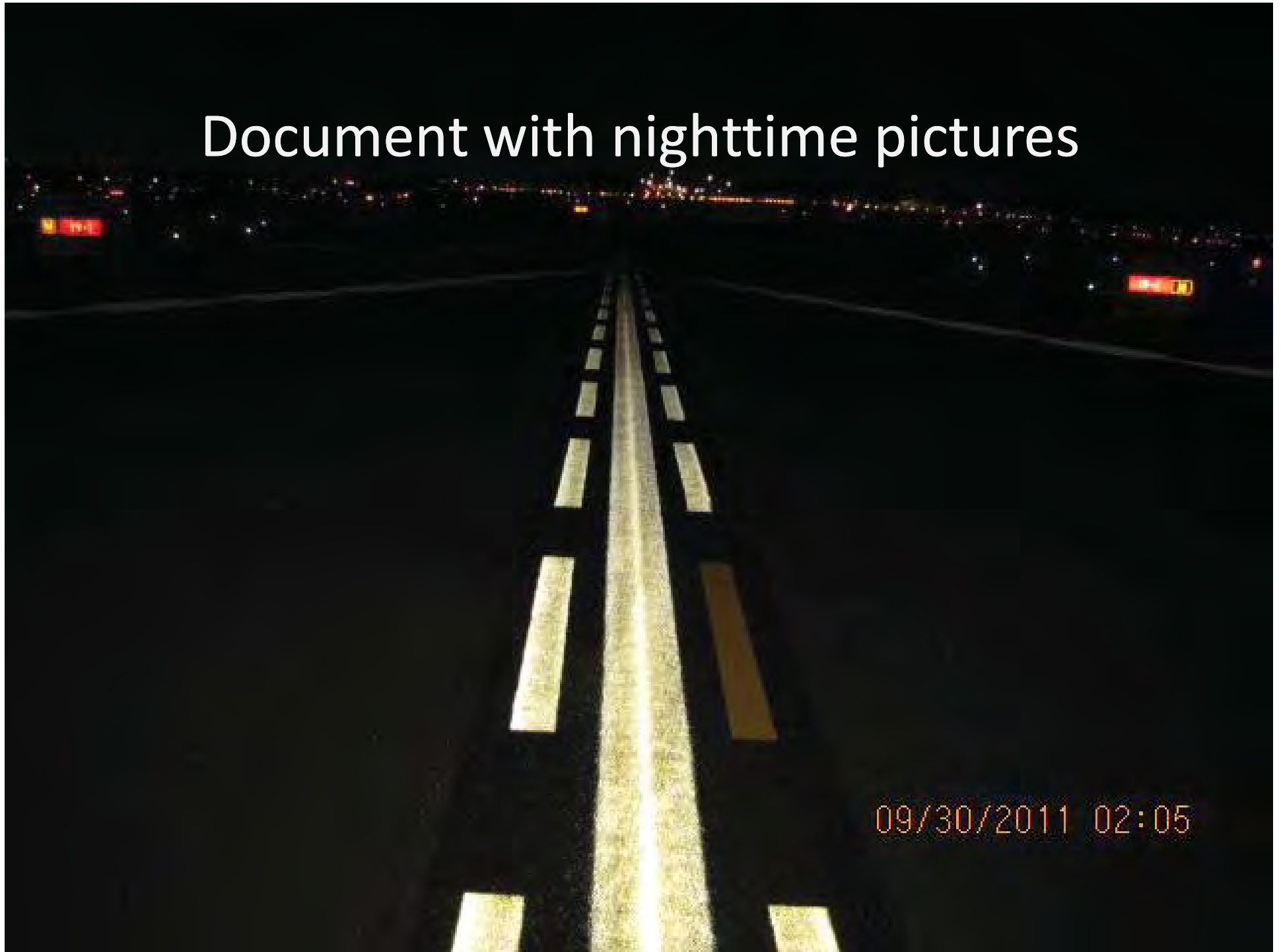


Document with nighttime pictures

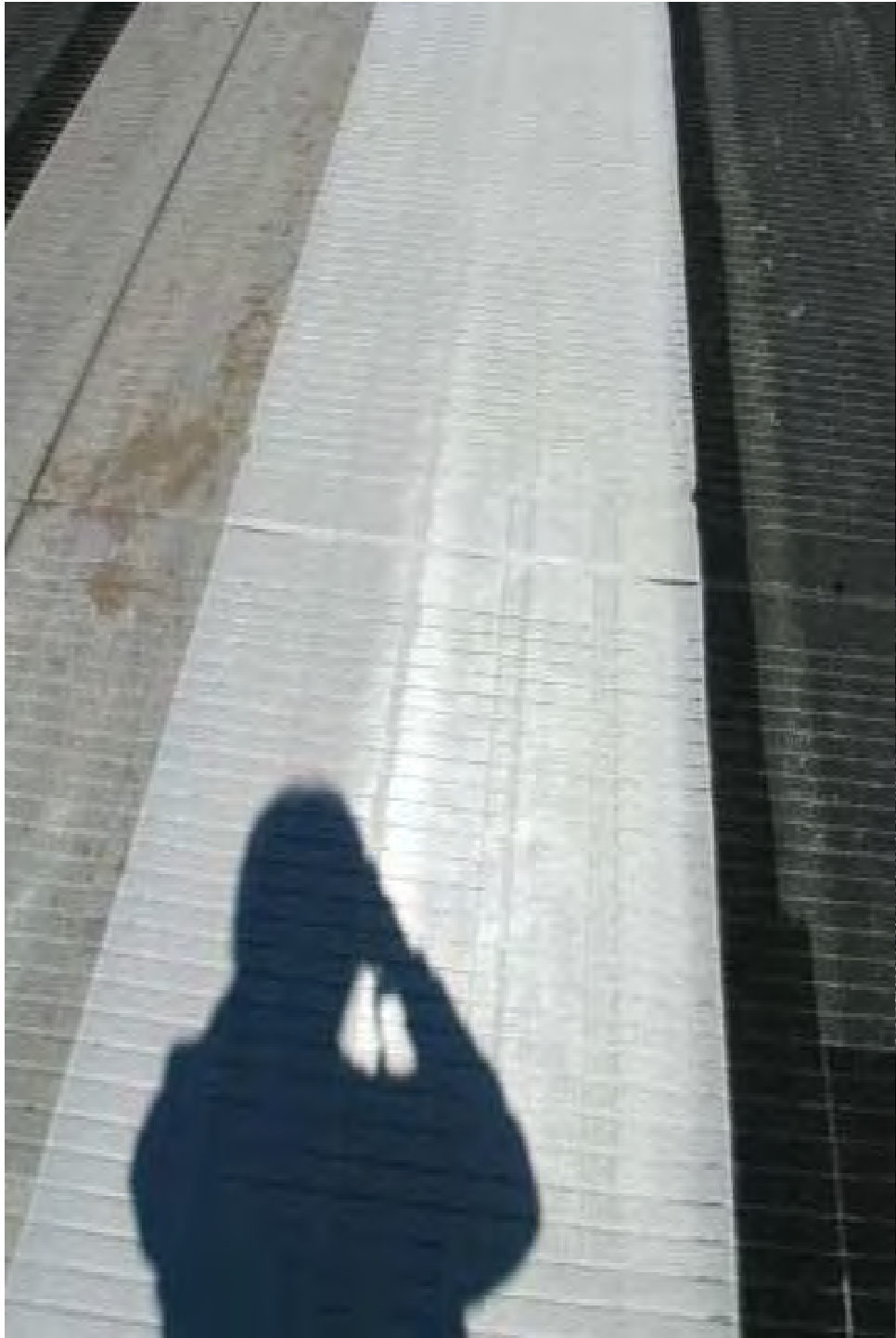
Check the new markings at night to ensure even distribution of the glass beads in the markings.



Document with nighttime pictures



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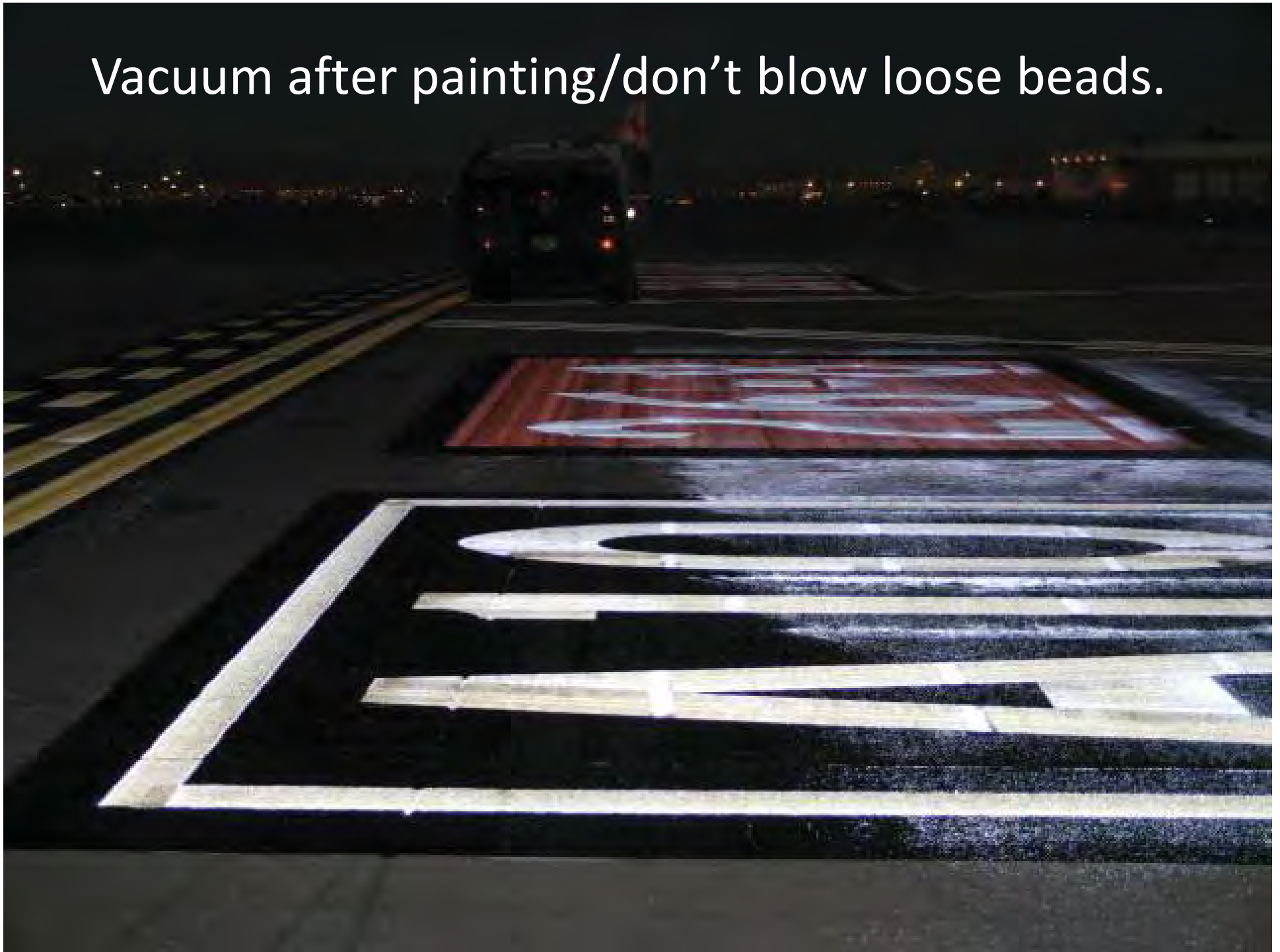








Vacuum after painting/don't blow loose beads.



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Checklist for Inspecting an Airfield Marking Project





Welcome To Sightline's Webletter!

Greetings from Sightline! Thank you to all of the new subscribers that have registered at Sightline.us to receive our webletter. Sightline specializes in Airport Marking Consulting, having 30 years of experience regarding pavement markings. The purpose of this seasonal publication, if it is new to you, is to inform about issues regarding Airport Markings.

We have been touring around the nation observing several airports and the techniques used to apply and maintain their markings. Our findings will be included in the airfield marking handbook to be completed in about a year. To read more about the handbook click the "What's New" button to the right and read the article below entitled "Roundtable Represents Aviation Industry".

We hope that you enjoy the following articles and strongly encourage feedback in the form of questions and comments! To send us feedback simply click on the "Contact Us" button on the right.



An enhanced centerline at night, looking back from the holdbar.

Roundtable Represents Aviation Industry

Recently Sightline was awarded a project, sponsored by the Innovative Pavement Research Foundation, to compile a "best practices" handbook by observing current

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The Mission - - Raise the Bar

- ➔ Improve safety through longer-lasting, better performing markings.
- ➔ Use the best methods and most suitable materials tailored to each airport.
- ➔ Realize a more cost-effective, efficient marking system.



THANK YOU!



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