Vincent M. Sugent
7768 Pleasant Lane
Ypsilanti, MI 48197
March 20, 2013

Karen Gorman
U.S. Office of Special Counsel
1730 M Street, N.W., Suite 300
Washington, D. C. 20036-4505

Dear Karen,

Thanks again for your time, patience and effort in addressing safety issues and improprieties at Detroit Tower. The following response covers OSC File DI-11-0165.

The Standard Instrument Departures portion of OSC File DI-11-0165 has been addressed and corrected to satisfaction. Although brought to closure, the amount of time taken to correct an obvious simple fix is unacceptable.

Our wind instrument issue on the other hand is still an unaddressed, uncorrected issue.

The Agency's correspondence dated September 5, 2012 to Senator Carl Levin states, *"The ASOS and WME are two separate systems which are not designed to be used at the same time or in comparison with one another because of their design differences."* The systems are being used at the same time with unacceptable results.

Attachment one shows that this statement is not accurate and that both systems are being used at the same time. You can see where issuing one wind via radio and one wind being broadcasted on the ATIS causes confusion between air traffic controllers, pilots and airline dispatchers. Aircraft have been pulled off of final approach and pilots have questioned runway usage. Airline dispatchers are actually calling the tower questioning runway usage. What is occurring is so unprofessional and embarrassing. Controllers, pilots and the flying public deserve more from the individuals who are supposed to be responsible for the National Airspace System.

Also included in attachment one are differences in direction, velocity and gusts and even broadcasting squalls when none were present. Controllers should not be dealing with these inquiries or problems. They distract controllers and supervisors from the safe movement of air traffic.

If this is not bad enough, in the correspondence dated January 14, 2013, the Agency states, *"The NWS has indicated that the ASOS is functioning properly, and FAA cannot authorize altering a system that belongs to the NWS."* The National Weather Service issuing mandates to the entity that is responsible for the safety of the flying public. The

National Weather Service is not even in the same department as the Agency. I also believe the Agency certifies the ASOS system for usage.

The NOAA/NWS website states, *"A basic strength of ASOS is that critical aviation weather parameters are measured where they are needed most: airport runway touchdown zone(s)."* This supports what has been stated repeatedly beginning with Mr. Chris Turner in December 2010.

Attachment two demonstrates how improperly operating wind instruments should be handled. Even after updates that were supposed to alleviate the differences between our wind sources, the WME has either failed or has been taken out of service at least 40 times since July 2012. Detroit is the 17th busiest tower in the nation and the Agency cannot supply the controllers with properly located and operating wind instruments.

Attachment three is the latest briefing issued to controllers. The Agency actually references an Advisory Circular addressing windsocks. The purpose of this particular circular is the specifications for wind cone assemblies which is the first item stated under the header. The circular also states, *"The standards contained in this advisory circular are recommended by the Federal Aviation Administration (FAA) in all applications involving airport development of this nature."* Airport development? Section 4.2.6 states, *"Test the windsock to assure that it extends fully when subjected to a wind....."* I am not sure how controllers are supposed to test a windsock, but this is a pathetic attempt of clarity by Mr. Bazman.

Nowhere in FAA Order JO 7110.65, FAA Order JO 7310.3 or the Aeronautical Information Manual will you find mention of the utilization of windsocks by controllers.

Where you will find mention of windsocks is in Order 7900.5, Surface Weather Observing, which states the following;

1-1. PURPOSE
This order prescribes aviation surface weather observing procedures and practices applicable to all FAA and FAA-contract personnel engaged in taking and reporting aviation surface observations, including Limited Aviation Weather Reporting Stations (LAWRS) personnel, Non-Federal Observation (NF-OBS) Program personnel, as well as United States Coast Guard (USCG) personnel as a component of the Department of Homeland Security (DHS). This order includes practices and procedures for both manual and automated observation locations. Also included are practices and procedures for augmentation of automated observations and backup information in the event of system failure, erroneous or non-representative data. These procedures and practices are intended to provide a framework for identifying meteorological phenomena of importance to aviation and reporting their occurrence.

8-5. ESTIMATING WIND DIRECTION
At facilities where instruments are not available for determining wind direction, the observer shall estimate the direction by observing the wind cone or tee, movement of

twigs, leaves, smoke, etc., or by facing into the wind in an unsheltered area. When estimating wind direction, the observer shall note that even small obstacles may cause variations in the wind direction. The observer shall not use the movement of clouds, regardless of how low the clouds are, in estimating the surface wind direction.

Look at the detail set forth for observers. We should not be doing this as controllers or supervisors. As I have said repeatedly, we are not weather observers. The weather observers need to do their jobs.

It is only a matter of time before this causes a serious incident or accident.

Thank you again for all of your time, effort and the opportunity to review, evaluate and comment on the report. If you any questions, do not hesitate to contact me.

Respectfully and sincerely,

Vincent M. Sugent

Vincent M. Sugent

1

10/29/12

NEW D21/DTW PROBLEM REPORT

12-21-12 .0000 VM
DATE: TIME (Z): INITIALS: POSITION: LE

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING OTHER
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able.

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter)

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG: NORTH FLOW TO WEST FLOW

	* TRAN		* RECV		TYPE AC
FREQ:	MAIN	STBY	MAIN	STBY	LOCATION

PROBLEM: WME WIND 32022G35. ASOS WIND BEING BROADCASTED ON ATIS 29020G30. WE WERE IN THE PROCESS OF CHANGING RUNWAYS. A PILOT ASKED ME IF I SAID THE WIND WAS 290. ANOTHER PILOT ANSWERED AND SAID NO, 290 WAS BEING BROADCASTED ON THE ATIS, WHICH AGAIN GETS THE WIND FROM ASOS. THE WME WIND PUT DEPARTURES OUT OF PARAMETERS. ASOS WIND WAS MORE CLOSELY ALIGNED WITH RY 27L/R. WHICH WIND INSTRUMENTS WERE MOST ACCURATE. THIS IS WHY YOU DO NOT BROADCAST ONE WIND ON THE ATIS AND ISSUE ANOTHER. JUST PATHETIC.

ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

Duplicate Flight Plans – FLMs fax to airline ASAP and then forward form to front office.
DELTA: 404-773-3957, **Attn: Ed Olsen**, COMAIR: 859 767-2081, PINNACLE: 901-348-4352,
Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-6829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date, Time, Initials

10/29/12

NEW D21/DTW PROBLEM REPORT

12-21-12 0357 VM LW

DATE: TIME (Z): INITIALS: POSITION:

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING OTHER
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able.

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter)

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG:

	* TRAN		* RECV		TYPE AC
FREQ:	MAIN	STBY	MAIN	STBY	LOCATION

PROBLEM: ATIS BROADCASTED WIND 30018G36. ATIS RECEIVES WIND FROM ASOS. WME WIND 32020G27. AAL2064 ON FINAL RY3R WAS PULLED OFF ~~OF~~ FINAL BECAUSE THE ATIS WIND WAS OUTSIDE PARMETERS. HE WAS ISSUED WME WIND WHICH WAS ACCEPTABLE. AND HE WAS TURNED BACK INBOUND.
WE ALSO RECEIVED PHONE CALLS FROM DAL ABOUT ATIS WIND AND AFTER WME WIND WAS GIVEN TO THEM, IT WAS FINE. THIS IS WHY YOU DO NOT BROADCAST ONE WIND VIA ATIS AND ISSUE ANOTHER. PATHETIC.

ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

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Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-6829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date, Time, Initials

10/29/12

NEW D21/DTW PROBLEM REPORT

2-6-13 .0030 VM

DATE: TIME (Z): INITIALS: POSITION: DTW

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING OTHER
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able. WIND

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter)

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG:

* TRAN * RECV TYPE AC

FREQ: MAIN STBY MAIN STBY LOCATION

PROBLEM: BEGINNING AT AROUND 2300Z THE ASOS WIND WAS BROADCASTING ~~16008~~ 16005G25 WITH SQUALLS. WME WIND 16005. THIS CAUSED PILOTS TO ASK GROUND WHAT THE WIND WAS. NWS CORRECTED THE WIND IN THE OBSERVATION. THE ASOS WIND CONTINUED TO DISPLAY WINDS FROM 19018G27 TO 16004G26 TO 21024G27 FOR AT LEAST AN HOUR. THE WME WIND DISPLAYED 16005 TO 17004. DURING THIS TIME FRAME. THE ASOS ALSO DISPLAYED 140V210 AND 110V210. THIS IS WHAT HAPPENS WHEN YOU BROADCAST ONE WIND AND ISSUE ANOTHER. ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

Duplicate Flight Plans – FLMs fax to airline ASAP and then forward form to front office.
DELTA: 404-773-3957, Attn: Ed Olsen, COMAIR: 859 767-2081, PINNACLE: 901-348-4352,
Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-6829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date, Time, Initials

THIS IS UNPROFESSIONAL

10/29/12

NEW D21/DTW PROBLEM REPORT

2-14-13 0020 VM

DATE: TIME (Z): INITIALS: POSITION: DTW

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING OTHER
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able. WIND

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter).

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG:

	* TRAN		* RECV		TYPE AC
FREQ:	MAIN	STBY	MAIN	STBY	LOCATION

PROBLEM:

0020z
ASOS – 30026G38 or M/M
ATIS – 25020G36
WME - 24016

0054z
ATIS – 30022G39 230V310

Due to the differences between the winds, we received numerous pilot and dispatcher calls questioning the winds and to depart RY 27L or 27R. This also generated phone calls between the NWS and the tower. We should not have to explain or justify our wind situation to the users. The OS/CIC and controllers have more pertinent issues to address during a rush other than the inaccurate, missed located wind instruments.

The is going to cause an accident or serious incident.

ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

Duplicate Flight Plans – FLMs fax to airline ASAP and then forward form to front office.
DELTA: 404-773-3957, Attn: Ed Olsen, COMAIR: 859 767-2081, PINNACLE: 901-348-4352,
Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-6829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date – Time – Initials

10/29/12

NEW D21/DTW PROBLEM REPORT

DATE: 3/15/12 TIME: 2:21 INITIALS: [redacted] POSITION: OS

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING OTHER
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able.

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter)

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG:

	* TRAN		* RECV		TYPE AC
FREQ:	MAIN	STBY	MAIN	STBY	LOCATION

PROBLEM:

ASOS WIND APPEARS INCR. WEATHER SERVICE HOURLY SHOWS ASOS WIND 300@22G39. TOWR WIND SHOWS 250@17. WIND SOCKS CONCUR WITH TOWR AS DOES PILOT REPORTS ON FINAL FOR 22R & 21L.
- AIRCRAFT ARE REQUESTING 27'S DO TO THIS ERRONEOUS READING
- AFTER 2 CALLS TO LOX SERVICE REQUESTING VERIFICATION, THE WEATHER SPECIALIST SAID THEY WERE HAVING EQUIPMENT PROBLEMS AND SHE CUT NEW WEATHER SHOWING WIND 230V310@22

ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

Duplicate Flight Plans – FLMs fax to airline ASAP and then forward form to front office.
DELTA: 404-773-3957, Attn: Ed Olsen, COMAIR: 859 767-2081, PINNACLE: 901-348-4352,
Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-6829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date, Time, Initials

10/29/12

NEW D21/DTW PROBLEM REPORT

2-17-13 1830 VM

DATE: TIME (Z) INITIALS: POSITION: LNW

* STARS EFSTS ETVS ASDE-X FREQ SSCS ROUTING (OTHER)
(circle appropriate problem/s) (similar call signs)

DUPLICATE FLIGHT PLANS – Provide flight progress strips if able. WIND

STARS CONFIG: FIXED PAIRS (multi func, D, slew & enter)

ACID: COMBINED: Y / N WITH:

EFSTS CONFIG:

	* TRAN		* RECV		TYPE AC
FREQ:	MAIN	STBY	MAIN	STBY	LOCATION

PROBLEM: 1830

ASOS 27011 > 80° DIFFERENCE.
WME 35009

1850

ASOS 29011G15
WME 35009

ATTACH FLIGHT STRIP HERE WHEN APPLICABLE
(STARS – EFSTS – SSCS – ROUTING issue's must be accompanied with a flight strip)

Duplicate Flight Plans – FLMs fax to airline ASAP and then forward form to front office.
DELTA: 404-773-3957, Attn: Ed Olsen, COMAIR: 859 767-2081, PINNACLE: 901-348-4352,
Skywest 435-634-3706, Shuttle America 317-484-2336, Compass 612-713-8829,
Go Jet 314-222-4775 (Please circle airline to whom you faxed)

CONTROLLERS - FORWARD TO FLM/CIC.
Mandatory Information – Date Time Initials

2

ATSAP Positives Bulletin

Issue:
ATSAP reports indicated that the wind instruments at Bishop International Airport (FNT) in Flint Michigan frequently provided incorrect wind direction and velocity readings. The age and condition of the equipment makes repairs and maintenance difficult and previous attempts to correct the problem were unsuccessful.

Potential Hazard:
Incorrect wind information can increase the likelihood of an aircraft accident.

Positive:
In May 2012, the ERC shared the information with facility management and the local facility representative. By requesting frequent updates and correspondence from the representatives, the ERC encouraged additional research and analysis, which discovered that the bullhorn holding the equipment was bent. In October 2012, the equipment was repaired and the instruments began to work as designed. The facility intends to install a more secure replacement in the future to prevent recurrence.

Issue:
In December 2012, a Confidential Information Sharing Program (CISP) partner shared an Aviation Safety Action Program (ASAP) report with a photo of a Pre-Departure Clearance (PDC) repeatedly encountered on an international flight from Washington Dulles International Airport (IAD) that included "RVR 75" in the remarks section. Its meaning confused the airline because 75 is not a reportable Runway Visual Range (RVR).

Potential Hazard:
Misinterpretation of current status information causes an air traffic incident or accident.

Positive:
After researching the issue, the ATSAP Analysis Team (AAT) determined that it referred to the International Civil Aviation Organization (ICAO) RVR in meters (as opposed to feet in the U.S.) and notified the CISP partner.

Issue:
Submitters reported that the Chicago Midway International Airport (MDW) wind equipment was old and often unreliable. MDW facility management feedback and input from local Technical Operations validated the problem, and that a new system is needed. A Needs Assessment Program (NAP) request to replace the centerfield wind equipment was submitted by facility personnel in 2009, but was denied.

Potential Hazard:
Inaccurate wind information could contribute to an aircraft accident.

Positive:
In April 2012, the ERC shared the reported information with facility management and the local facility representative to help facilitate a solution. Representatives from the Air Traffic Control Tower (ATCT), Technical Operations, and the District Office worked together to allocate funds, coordinate with the Spectrum Assignment and Engineering Team for an assigned frequency, and install a new Low Level Windshear Alert System (LLWAS). The new system was installed in October 2012.

Issue:
On numerous occasions, a particular foreign air carrier traversing through Los Angeles Air Route Traffic Control Center (ZLA ARTCC) airspace would misinterpret a clearance to fly a Standard Terminal Arrival Route (STAR) as a "descend via" clearance and would descend at a point on the STAR into an area of high density traffic.

Potential Hazard:
Miscommunication causes an operational incident.

Positive:
The ERC, through the use of a National Air Traffic Controllers Association (NATCA) International representative, was able to communicate the issue to a foreign airline prior to an instance of reported non-compliance. The chief pilot put out a safety bulletin on October 15, 2012, highlighting the reported concern to the pilot workforce.

3

Federal Aviation Administration

Memorandum

Date: 03/01/13

To: All Personnel

Ronald D Bazman

From: Ronald D. Bazman, Support Manager, DTW ATCT

Prepared by: Ronald D. Bazman, 734-955-5050

Subject: Windsock Wind Estimates

R&I	03/01/13
PRE-DUTY	X
DURING SHIFT	
GIB	
Remove On	04/01/13
Originator	BA
Copies to	

On July 10, 2012 we issued Notice DTW N7110.222 that designated the primary wind source for operational purposes as the Wind Measuring Equipment (WME). The ASOS magnetic winds are designated as a back-up wind source to the WME, and winds shall be estimated from the centerfield windsock (located north of Taxiway V and east of Taxiway K) if both the WME and ASOS winds are logged out of service.

We have received several comments that indicated some confusion exists regarding windsock wind estimates. To clarify, the centerfield windsock mentioned above is a 15-knot windsock. In accordance with the Advisory Circular attached (optional reading), the windsock must move freely and align with a 3-knot or more wind. Wind direction is the opposite of the direction in which the windsock is pointing. Additionally, it must extend fully when subjected to a wind of 15 knots (+2,-1). In short, the sock will point the opposite direction from the wind source and a fully extended sock will indicate winds that are approximately 15 knots or greater. Use your best judgment for estimating winds when the sock is not fully extended, or when winds appear significantly above 15 knots. Additionally, you may also gather wind data from other sources such as pilot reports or surrounding facilities to aid in determining your estimate.

Please advise if you have additional questions.

HOW ARE WE SUPPOSED TO "TEST" THE WINDSOCK? (4-2-6)

U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

Subject: FAA SPECIFICATION FOR WIND CONE ASSEMBLIES	**Date:** 6/2/04 **Initiated by:** AAS-100	**AC No:** 150/5345-27D **Change:**

1. **PURPOSE.** This advisory circular (AC) contains a specification for wind cone assemblies to be used to provide wind information to pilots of aircraft.

2. **PRINCIPAL CHANGES.** The principal changes in this AC are:

   a. The equipment qualification requirements to be furnished under the Federal grant assistance program for airports has been revised.
   b. The new specifications for internally lighted wind cones have been added.
   c. Editorial changes have been made.

3. **CANCELLATION.** AC 150/5345-27C, Specification For Wind Cone Assemblies, dated July 19, 1985, is canceled.

4. **APPLICATION.** The standards contained in this advisory circular are recommended by the Federal Aviation Administration (FAA) in all applications involving airport development of this nature. The specification is an acceptable means for compliance with Federal Aviation Regulation (FAR) Part 139 where such facilities may be required. For airport projects receiving Federal grant-in-aid assistance, the use of these standards is mandatory.

5. **METRIC UNITS.** To promote an orderly transition to metric units, this specification includes both English and metric dimensions. The metric conversions may not be exact equivalents and until there is an official changeover to the metric system the English dimensions will govern.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

FAA SPECIFICATION FOR WIND CONE ASSEMBLIES

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers fabric windsocks and their supporting structures used at airports and heliports to indicate surface wind conditions.

1.2 Wind Cone Assemblies Classification.

1.2.1 Types.

L-806 - those mounted on low mass supporting structures
(typical assemblies are shown in figure 1)

L-807 - those mounted on rigid supporting structures
(typical assemblies are shown in figure 2)

1.2.2 Styles.

Style I-A – externally lighted

Style I-B - internally lighted (typical internally lighted wind cone is shown in figure 3)

Style II – unlighted

1.2.3 Sizes.

Size 1 - 8 feet (2.5 m), for use with Type L-806 and L-807 assemblies.

Size 2 - 12 feet (3.75 m), for use with Type L-807 assemblies.

2. REFERENCED DOCUMENTS.

2.1 General. The following is a list of documents referenced in this advisory circular.

2.2 Federal Aviation Administration (FAA) Advisory Circulars.

AC 150/5345-43	Specification for Obstruction Lighting Equipment
AC 150/5345-45	Lightweight Approach Light Structure
AC 150/5345-53	Airport Lighting Equipment Certification Program

2.3 Federal Standard.

FED-STD 191A Textile Test Methods, or current version

(Copies of FAA advisory circulars may be downloaded from http://www.faa.gov/arp/150acs.cfm)

3. EQUIPMENT REQUIREMENTS

3.1 Environmental Conditions. The wind cone assemblies must be designed to operate under the following environmental conditions:

a. Temperature. Any ambient temperature between -67°F (-55°C) and 131°F (+55°C.)

b. Wind. Wind speed up to 75 knots (140 km/hr or 86 mph).

3.2 Fabric Windsocks.

3.2.1 Fabrication. The fabric windsock must be made so it takes the shape of a truncated cone when it is filled with air; be reinforced at all points that are subject to abrasion by flexing against the metal framework; and be designed to allow removal and replacement without the use or special tools or stitching. The fabric windsock must be constructed to allow water drainage out of the area of the basket assembly.

3.2.2 Dimensions. The minimum effective length and the throat end opening diameter of the fabric windsock are as follows:

a. **Size 1** - Eight feet (2.5 m) in length and 18 inches (0.45 m) in throat diameter.

b. **Size 2** - Twelve feet (3.75 m) in length and 36 inches (0.9 m) in throat diameter.

The taper or the fabric windsock from the throat to the trailing end must be designed to cause the windsock to fully extend when exposed to a wind of 15 knots (28 km/hr or 17 mph).

3.2.3 Fabric. Fabric for the windsock may be made of cotton, a synthetic material, or a blend of the two, and may be coated. If the fabric is not naturally immune to water absorption, it must be treated to become water repellent. Color of the windsock fabric may be natural (white), yellow, or orange. Color will be specified by the purchaser. The manufacturer must certify that the fabric meets the following requirements:

a. Minimum breaking strength: Warp - 150 pounds (667 N); Filling - 150 pounds (667 N). The method 5102 of FED-STD-191A can be used to determine the minimum breaking strength.

b. Good or better colorfastness as determined by Method 5671 of FED-STD-191A.

3.3 **Framework.** A framework must be provided to hold the throat of the fabric windsock fully open under no wind conditions and to provide an interface with the support. It must be of low-mass design so as to offer minimum resistance to an inadvertent strike by aircraft. The framework may be made of metallic or nonmetallic material. Ferrous materials must be hot-dipped galvanized, zinc plated, or epoxy-resin coated to provide protection against corrosion. The framework is to be constructed so as to deter the accumulation of water in the windsock. The framework must support the fabric windsock in a rigid position for three-eighths of its length. When the fabric windsock is attached to the framework the combination must perform as a wind vane. Bearings, bushings, or like devices must be either permanently lubricated or provided with fittings to allow periodic lubrication.

3.4 **Supporting Structures.** Typical supporting structures are shown in figures 1 through 3. Although the illustrations are typical, the dimensions shown are to be complied with.

3.4.1 **Type L-806.** The type L-806 support must be of low-mass, and designed for easy installation and maintenance. When firmly anchored, the frangible support must withstand a moment of 350 pound-feet (475 N m) without damage and fail before a moment of 700 pound-feet (950 N m) is reached by a force applied parallel to and 6 feet (1.8 m) above the surface to which the support is attached. Alternatively, a support meeting the requirements of AC 150/5345-45, Lightweight Approach Light Structure, may be used.

3.4.2 **Type L-807.** The type L-807 support may be hinged at its base or near its middle so the wind cone and light fixture can be serviced from the ground. When the support is mounted in place, it must withstand, without damage, a moment of not less than 3200 pound-feet (4340 N m) when the force is applied parallel to and 16 feet (4.8-m) above the surface to which the support is attached. This support may be used only where allowed by airport design standards published in AC 150/5300-13, Airport Design.

3.5 **Windsock Movement.** The windsock must move freely about the vertical shaft it is attached to and when subjected to wind of 3 knots (5.6 km/hr or 3.5 mph) or more and indicate the true wind direction within +/- 5 degrees.

3.6 **Photometric requirements.** Light fixtures must be placed and aimed to minimize objectionable glare to aircraft pilots. Wiring from the base of the supporting structure to the light fixture must be housed in the structure or in electrical conduit. Electrical cable must be of proper type and size for its application.

3.6.1 Style I-A, externally lighted wind cone assemblies must be supplied with sufficient light fixtures to provide a minimum of 2 foot-candles (fc)(21.5 lux) illumination on any point of the horizontal plane described by the complete rotation of the upper surface of a fully extended cone.

3.6.2 Style I-B, internally lighted wind cone assemblies must be size 2 and must have at least two (2) spotlights mounted internally within the windsock throat section. Two separate lamps are used in the assembly so that failure of a single lamp will not render the unit ineffective at night. The power supply arrangement must be in such a way that when transferring electrical

power to the lamps the wind cone assembly is allowed to rotate freely with the existing wind. The top and lateral surfaces of the fabric windsock of style I-B wind cone assemblies must have an average luminance of 10 to 30 ft-lamberts (fL) and a minimum luminance at any point of 2 ft-lamberts (fL).

3.7 Obstruction Light. When required, an L-810 obstruction light conforming to AC 150/5345-43, Specification for Obstruction Lighting Equipment, must be supplied. The obstruction light is to be mounted at the highest point of the wind cone assembly to avoid being obscured by any other part when viewed from above.

3.8 Painting. All exposed metal parts of the wind cone assembly, except reflecting surfaces of light fixtures, must be given one prime, one body, and one finish coat of paint. The prime coat must be appropriate for the particular metal being painted. The finish coat must consist of a colorfast orange color paint.

3.9 Equipment Parts and Instructional Manual. A manual must be supplied with each wind cone assembly containing, as a minimum, the following information:

a. Complete wiring diagram for lighted wind cones.

b. Complete parts list with the name and part number of the original manufacturer.

c. Assembly and installation instructions, including mounting foundation and anchor bolt requirements.

d. Maintenance instructions.

4. EQUIPMENT QUALIFICATION REQUIREMENTS.

4.1 Qualification Procedures. Procedures for qualifying equipment to be furnished under the federal grant assistance program for airports are contained in Advisory Circular 150/5345-53, Airport Lighting Equipment Certification Program.

4.2 Qualification Tests.

4.2.1 General. Each type, style, and size of wind cone assembly for which approval is requested must be tested.

4.2.2 Windsock Cone Attachment. Test the attachment of the fabric windsock to the metal framework by applying the following tension to the free end of the wind cone:

a. Size 1 - 45 pounds (200 N)

b. Size 2 - 100 pounds (450 N)

Any distress noted in the fabric windsock or the means of attachment will be cause for rejection.

4.2.3 Support Rigidity. Mount the support on a surface to simulate its normal field installation and apply the following forces to the support. The force must be applied parallel to and at the specified distance from the surface:

Type	Force		Distance
	Hold	Fail by	
L-806	58 lb. (264 N)	117 lb. (530 N) 1/	6 ft. (1.8 m)
L-807	200 lb. (890 N)	-	16 ft. (4.9 m)

1/ Low mass structures must cause minimal damage when struck by aircraft. The structure must not wrap around the aircraft but must crumple or collapse on impact.

4.2.4 Windsock Movement. Test the windsock movement around the vertical axis. The windsock must move freely and align with a 3-knot (5.6 km/hr or 3.5 mph) wind as specified in paragraph 3.5. The wind test must be run at no less than 6 equally spaced points about the vertical axis.

4.2.5 Photometric Test

4.2.5.1 Style I-A, Externally Lighted Wind Cone. The illumination must be tested at the throat, trailing end, and center points of the upper surface of the extended fabric wind cone at 30-degree intervals throughout a complete horizontal rotation of the wind cone. The illumination at the test points must not be less than 2 foot-candles as noted in paragraph 3.6.1.

4.2.5.2 Style I-B, Internally Lighted Wind Cone. The internally lighted wind cone must be tested for luminance while fully extended. Luminance measurements must be taken from 1 foot away from the throat to 11 feet away from the throat at 1-foot intervals and 45-degree increments around the circumference of the wind cone. The spot-size for the luminance measurement must be 1.5 inches in diameter. The average luminance on the top and lateral surfaces of the windsock must be between 10 and 30 foot-lamberts as noted in paragraph 3.6.2.

4.2.6 Windsock Extension. Test the windsock to assure that it extends fully when subjected to a wind of 15 (+2,-1) knots (+3.7, -1.8) km/hr or (+2.3, -1.2 mph)).

4.2.7 Windsock Fabric. Supply a certification from the fabric manufacturer that the fabric meets the requirements in paragraph 3.2.3. The manufacturer must retain on file written letters of conformance from the fabric manufacturer for all fabric used in the wind cone manufacture.

5. PRODUCTION TEST REQUIREMENTS

5.1 Production Tests. A certified copy of test reports on the tests specified in paragraph 4.2.5, must be made available by the manufacturer upon written request by the FAA.

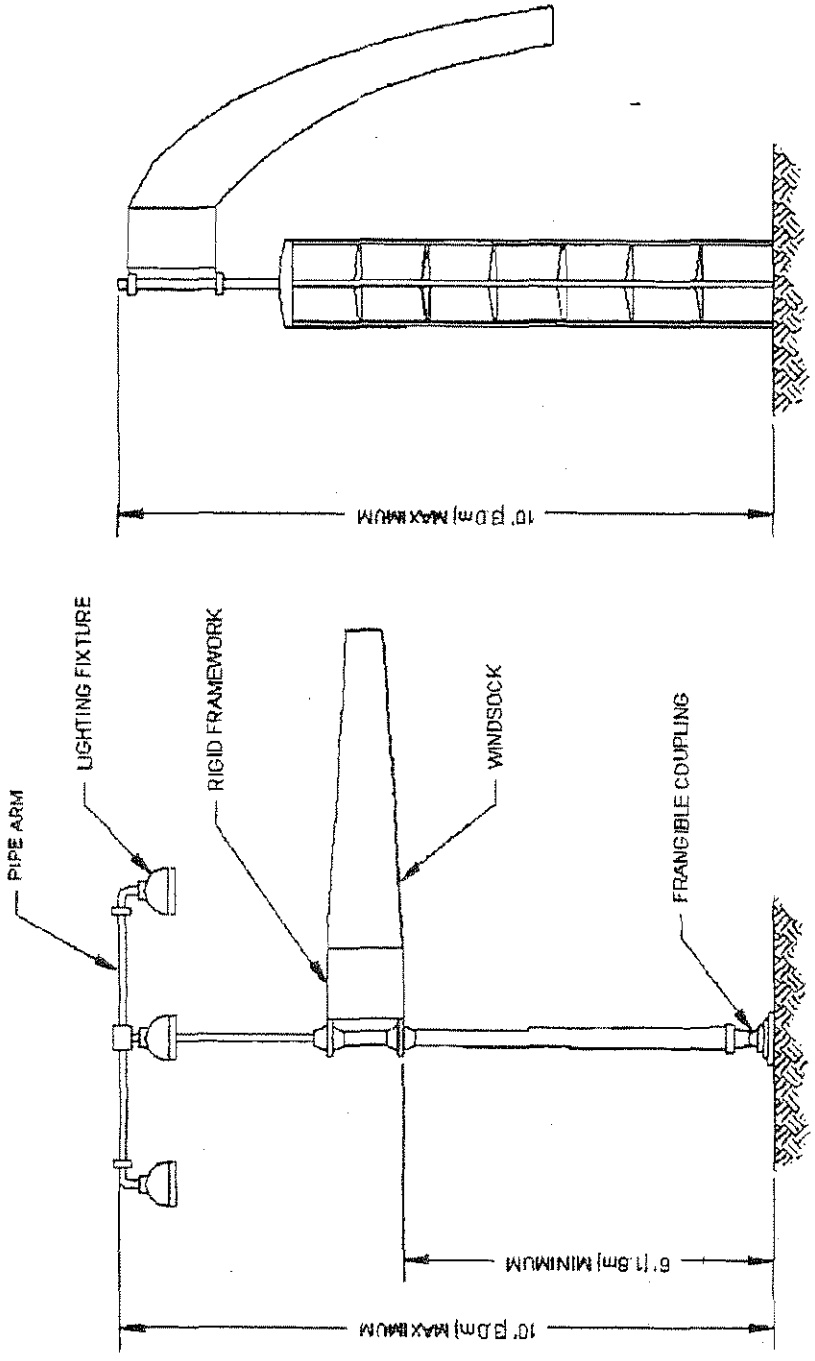

Figure 1. Typical Type L-806 supports

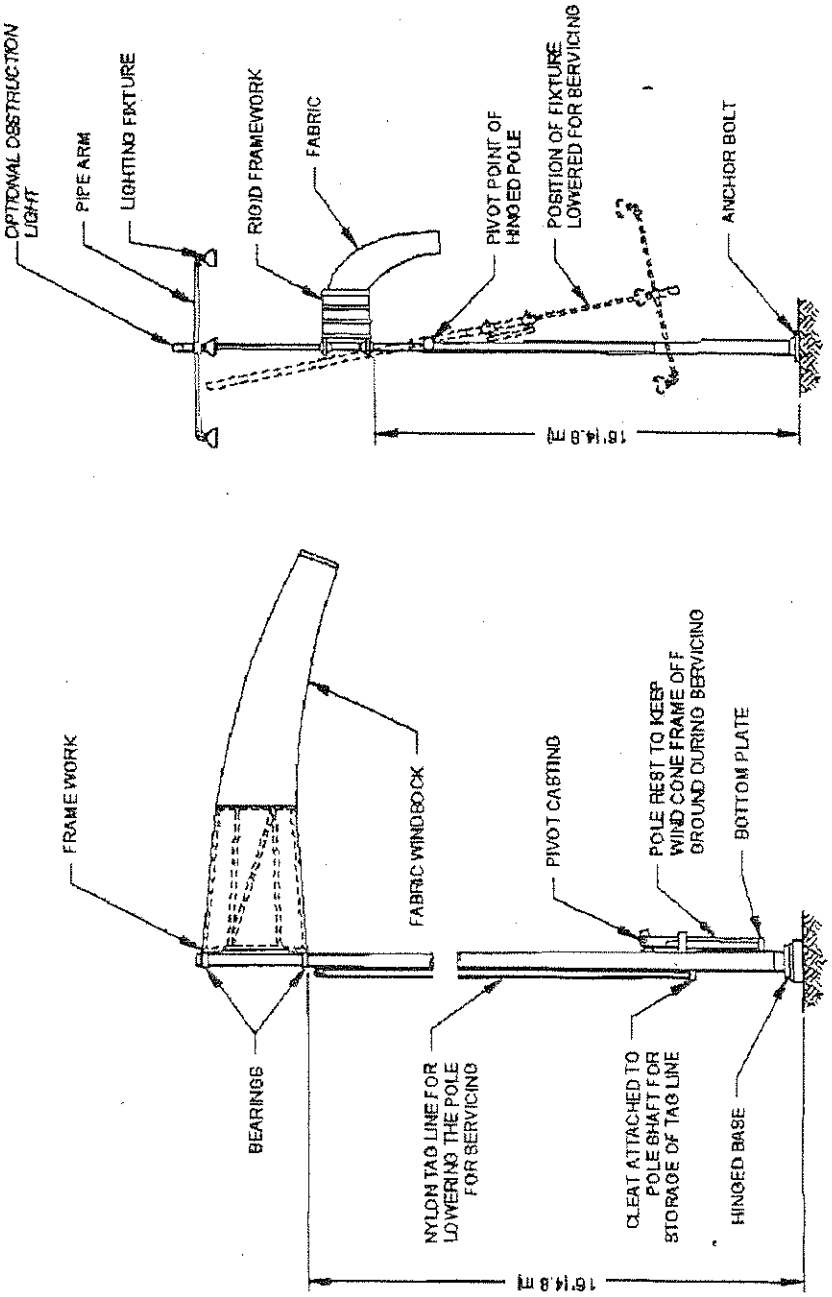

Figure 2. Typical Type L-807 supports

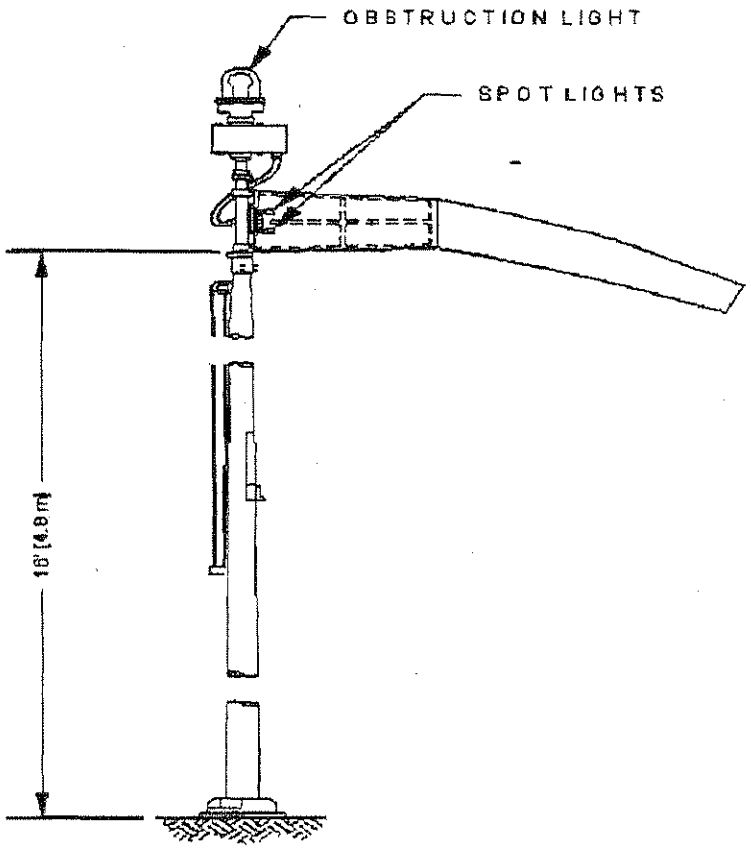

Figure 3. Typical Internally Lighted Wind Cone.