Rural Training Center – Thailand (RTC-TH)

FOCUS

Community-based Environmental Education for the Self-sufficiency and Sustainability of Small Rural Family Farms

Advanced MEWS Weather Observing Lesson A2:

Measuring Wind Speed and Wind Chill

2012 Ed

Photos from the Internet; educational fair use clause

Advanced Temperature measurements are needed to

- Wind Chill Temperature

The topics below are covered in other Advanced MEWS lessons.

- Calculate Relative Humidity
- Heat Stress Index
- Dew Point Temperature
- Cloud Base Height

You may want to review MEWS Lesson B1 about basic temperature measurement before proceeding.

A Mobile Emergency Weather Station (MEWS) Training Series presentation

Rural Training Center-Thailand
Emergency Communications Program

Ready to serve and sustain our community

For other lessons in the series e-mail hsØzhm@gmail.com
www.neighborhoodlink.com/RTC-TH_Tech/pages

A part of the RTC-TH EmComm Program

The Rural Training Center-Thailand Emergency Communications program is a volunteer effort to provide emergency amateur radio communications for local community self-sufficiency and sustainability in times of need.

The Rural Training Center-Thailand (RTC-TH)

is an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms

www.neighborhoodlink.com/org/rtcth

E-mail: rtc2k5@gmail.com

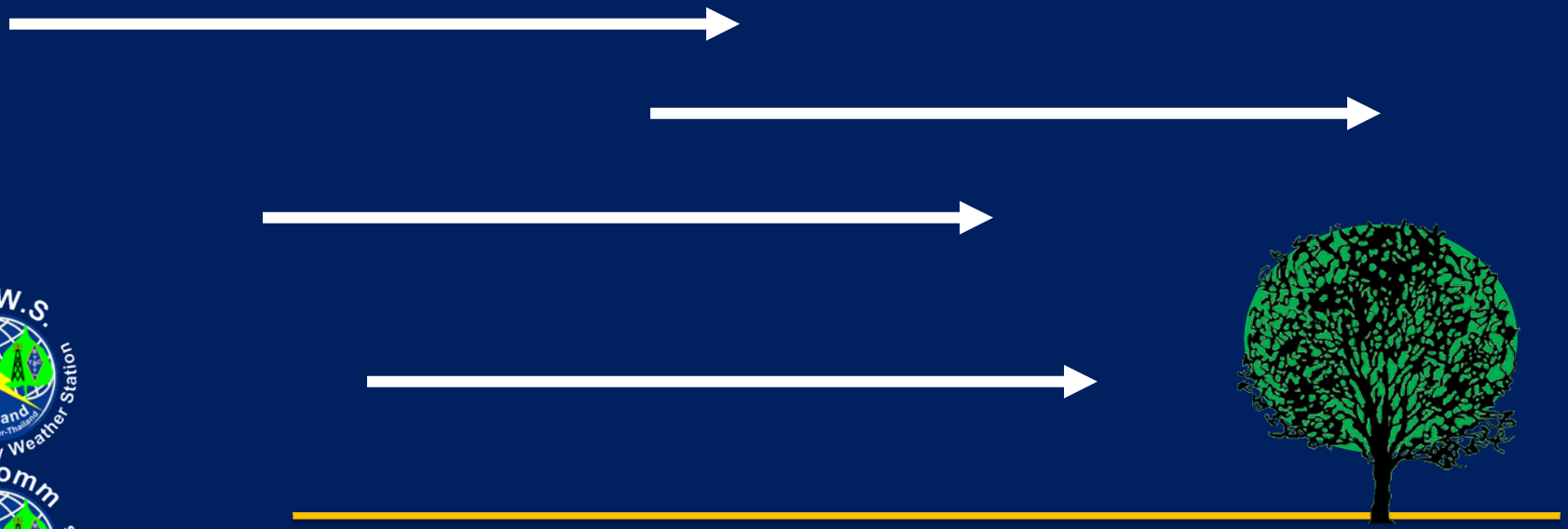
MEWS adapts weather lessons from two existing RTC-TH programs

E-mail: rtc2k5@gmail.com
www.neighborhoodlink.com/RTCTH_Tech/pages

The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan, a father, farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.

Wind

is the horizontal movement of air over the surface of the Earth.



The wind can move at different speeds.

Wind affects survivors

Wind + Low temperatures + high relative humidity =

Survivors feeling colder. They are more stressed and uncomfortable.

This is also true if you are wet or high in the mountains.

The amount of danger can be determined by the wind chill factor.

Photos from the Internet; educational fair use clause

Wind affects flight operations.

Helicopters need to know the wind speed & direction when landing & taking off.

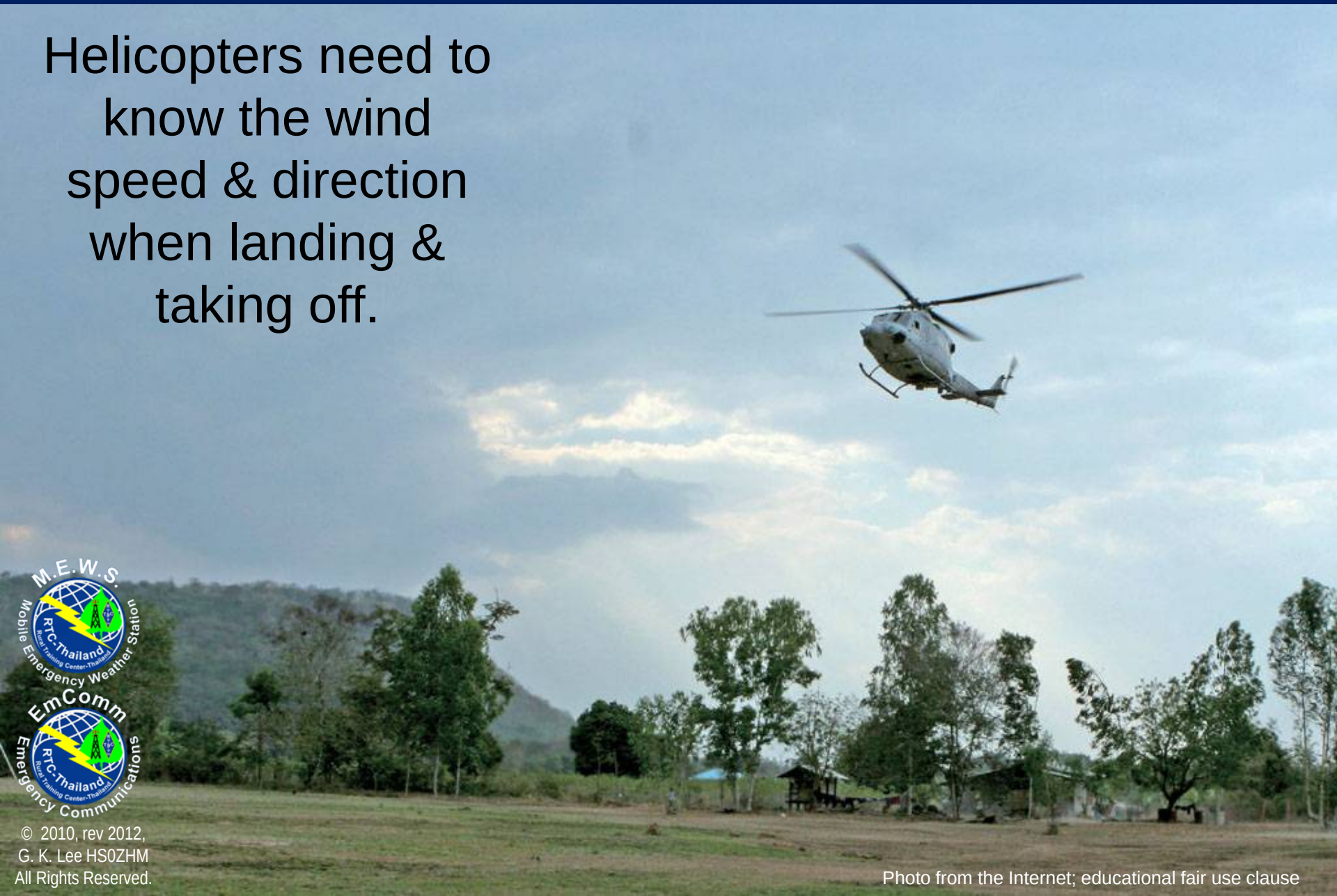


Photo from the Internet; educational fair use clause

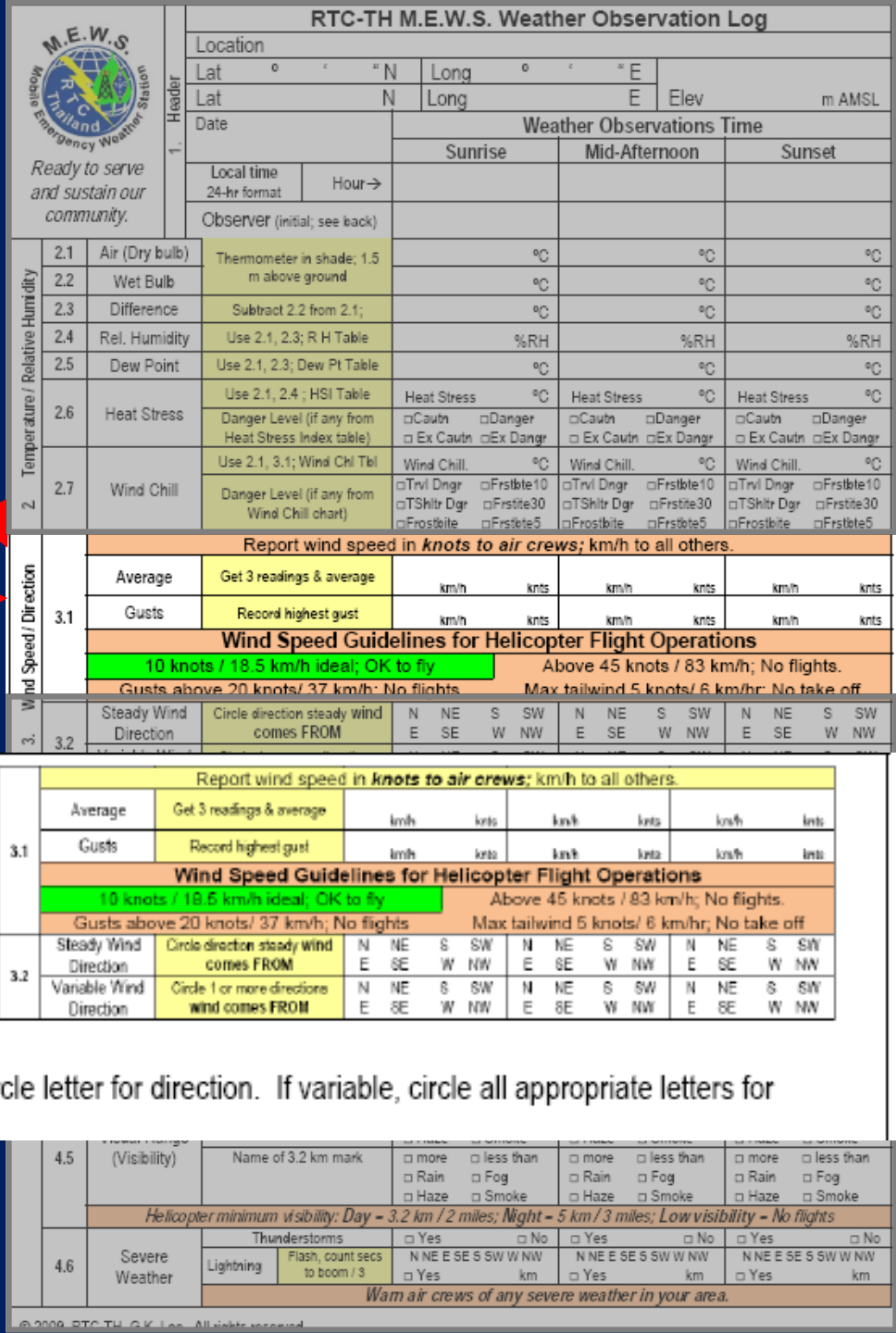
Wind affects flight operations.

Blowing dust and debris can obscure landing zones making flight operations hazardous

Photos from the Internet; educational fair use clause

Record the wind speed in Section 3.1

Guide notes are on the front of the form. More notes are on the back of the form.



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

Local time 24-hr format Hour→

Observer (initial; see back)

Ready to serve and sustain our community.

1. Header

2. Temperature / Relative Humidity

			Sunrise	Mid-Afternoon	Sunset
2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbite5

Wind Speed / Direction

			Sunrise	Mid-Afternoon	Sunset
3.1		Report wind speed in ***knots to air crews;*** km/h to all others.			
	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
		Wind Speed Guidelines for Helicopter Flight Operations			
		10 knots / 18.5 km/h ideal; OK to fly	Above 45 knots / 83 km/h; No flights.		
		Gusts above 20 knots/ 37 km/h; No flights	Max tailwind 5 knots/ 6 km/hr; No take off		
3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW / E SE W NW	N NE S SW / E SE W NW	N NE S SW / E SE W NW

Wind Speed / Direction

3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. *Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.*

3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions.

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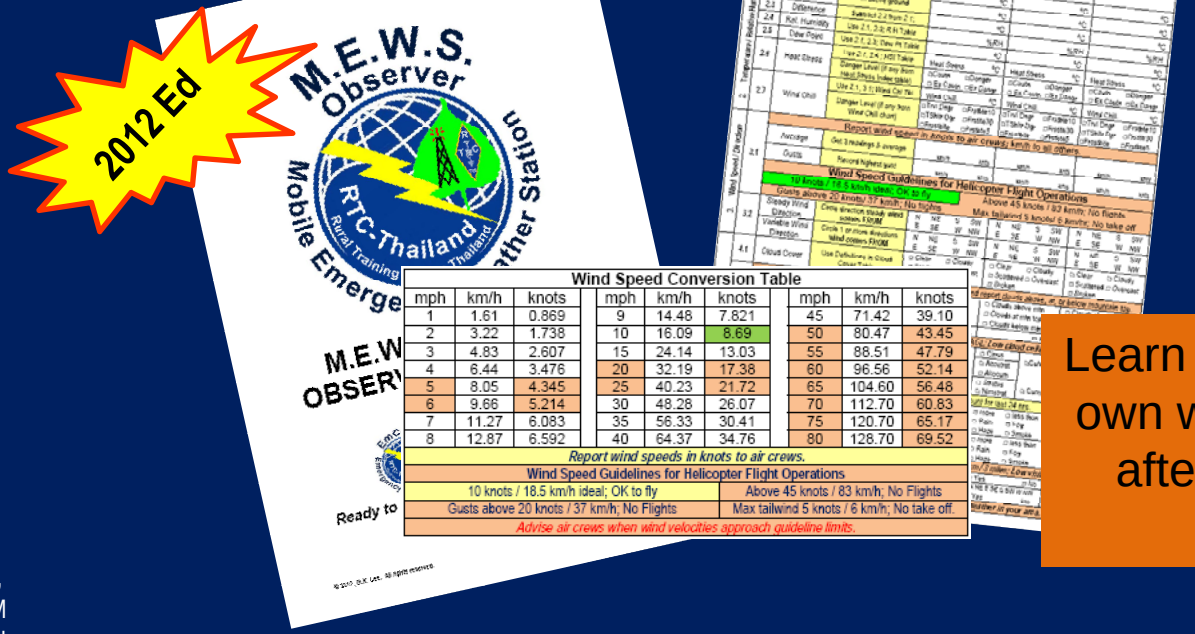
3. Wind Speed / Direction

			Sunrise	Mid-Afternoon	Sunset
4.5	(Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights			
4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
		Warn air crews of any severe weather in your area.			

See Handbook: 3.1 Wind Speed, p. 17

You can know the wind chill using a wind speed gauge

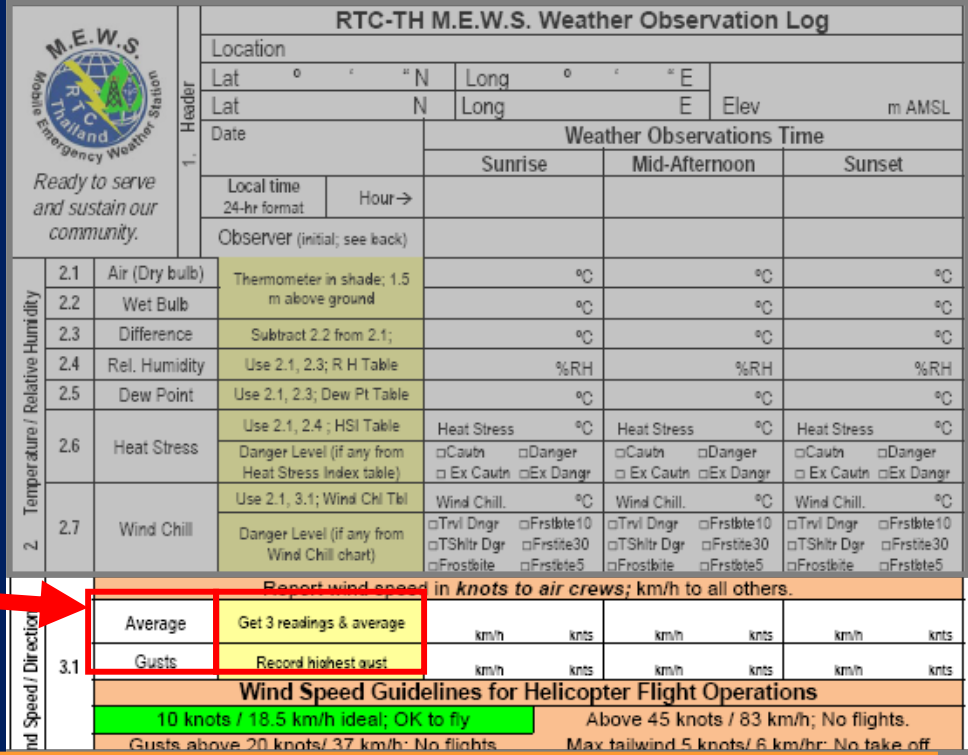
You will need a pencil, the MEWS handbook & log sheet, and a wind speed gauge (with conversion table).



Learn how to make your own wind speed gauge after the end of this lesson.

Report the measured wind speed in Section 3.1

Guide notes are on the front of the form.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Observer (initial; see back)

Ready to serve and sustain our community.

2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
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2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
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Report wind speed in *knots to air crews;* km/h to all others.

3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/hr; No take off

3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW

□ Haze □ Smoke | □ Haze □ Smoke | □ Haze □ Smoke

Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights

Thunderstorms □ Yes □ No | □ Yes □ No | □ Yes □ No

Lightning — Flash, count secs to boom / 3 — N NE E SE S SW W NW □ Yes km | N NE E SE S SW W NW □ Yes km | N NE E SE S SW W NW □ Yes km

Warn air crews of any severe weather in your area.

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Wind Speed / Direction

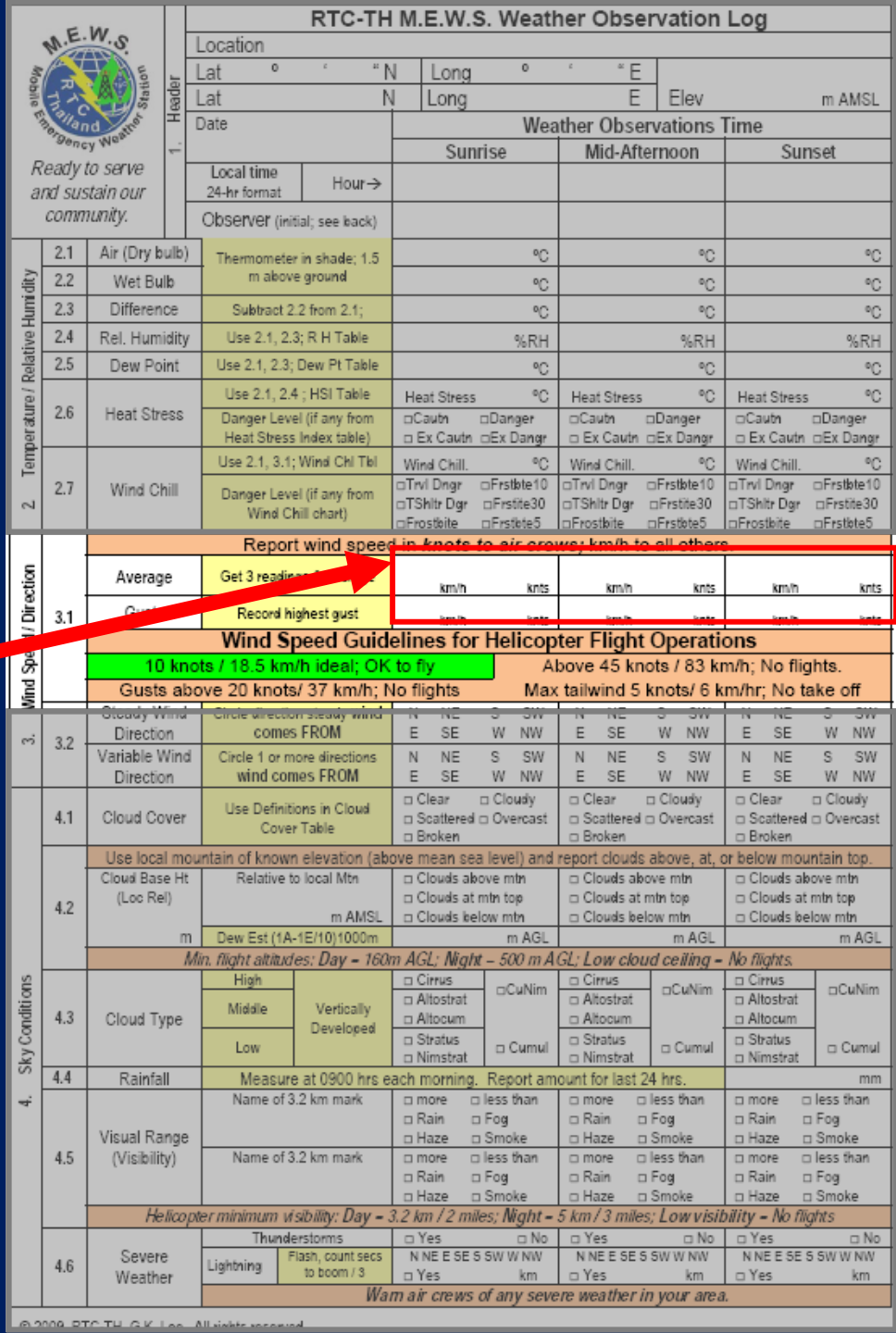
3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. ***Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.***

3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions.

More detailed notes are on the back of the form.

See Handbook Section 3, pp.17-19

Record all wind speeds in km/h and knots.



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header	Location				
	Lat ° ' "N	Long ° ' "E			
	Lat N	Long E	Elev m AMSL		
	Date	Weather Observations Time	Sunrise	Mid-Afternoon	Sunset
	Local time 24-hr format	Hour→			
	Observer (initial; see back)				
2. Temperature / Relative Humidity	2.1 Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2 Wet Bulb		°C	°C	°C
	2.3 Difference	Subtract 2.2 from 2.1;	°C	°C	°C
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Wind Speed / Direction	3.1 Average	Get 3 readings [illegible]	km/h knts	km/h knts	km/h knts
	Gust	Record highest gust	km/h knts	km/h knts	km/h knts
	Report wind speed in knots to air crews; km/h to all others				
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3.	3.2 Steady Wind Direction	Circle direction steady wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
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4. Sky Conditions	4.1 Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2 Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.				
	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	m AMSL / Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
	Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.				
	4.3 Cloud Type	High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
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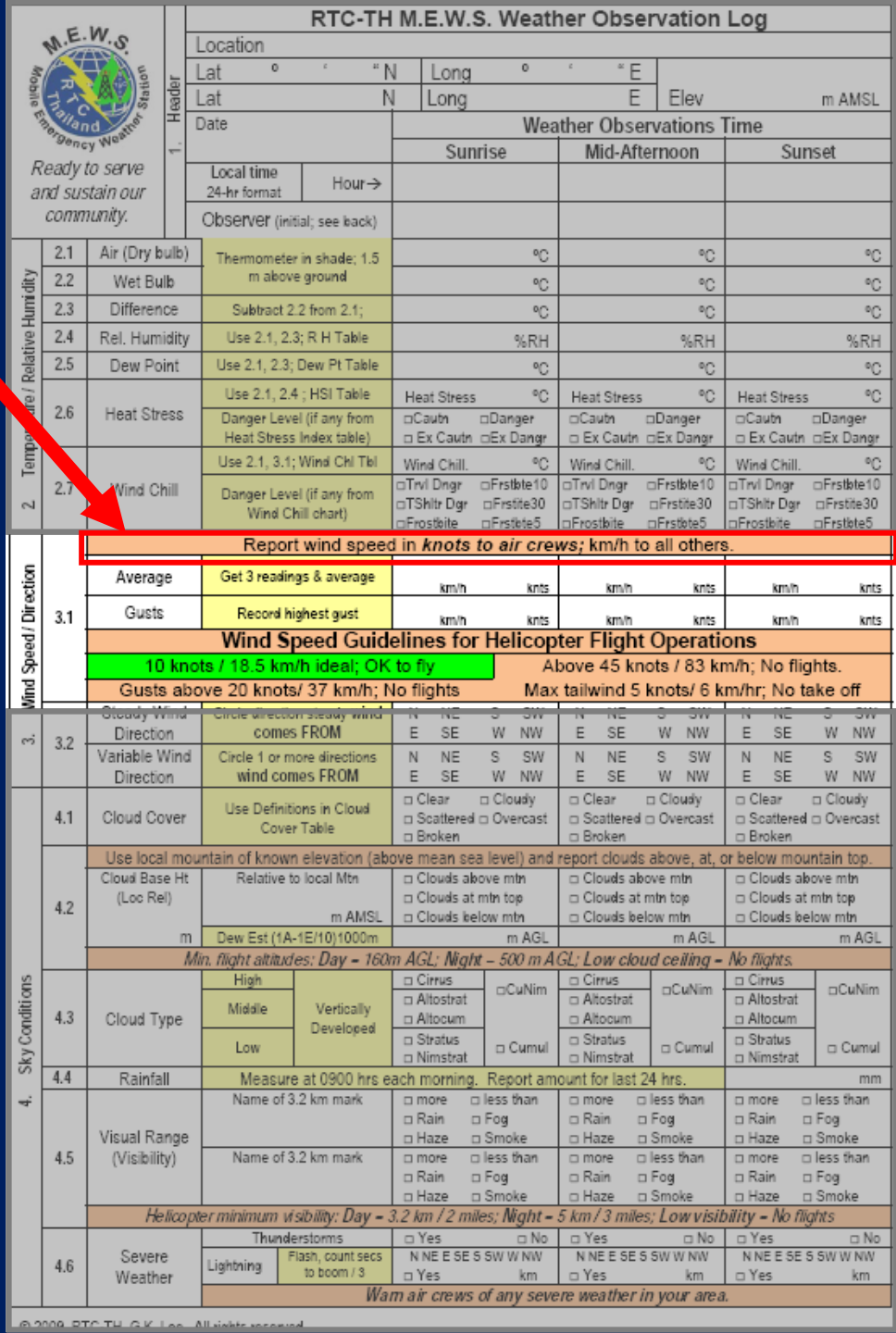
	4.6 Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning / Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
	Warn air crews of any severe weather in your area.				

There is a reminder to report wind speed in knots to air crews



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Location

Lat ° ' "N Long ° ' "E

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Local time 24-hr format (Hour→)			
Observer (initial; see back)			

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M.E.W.S. Mobile Emergency Weather Station — RTC-Thailand Rural Training Center-Thailand

EmComm Emergency Communications — RTC-Thailand Rural Training Center-Thailand

Brief notes remind you of wind speeds affecting helicopter flight operations

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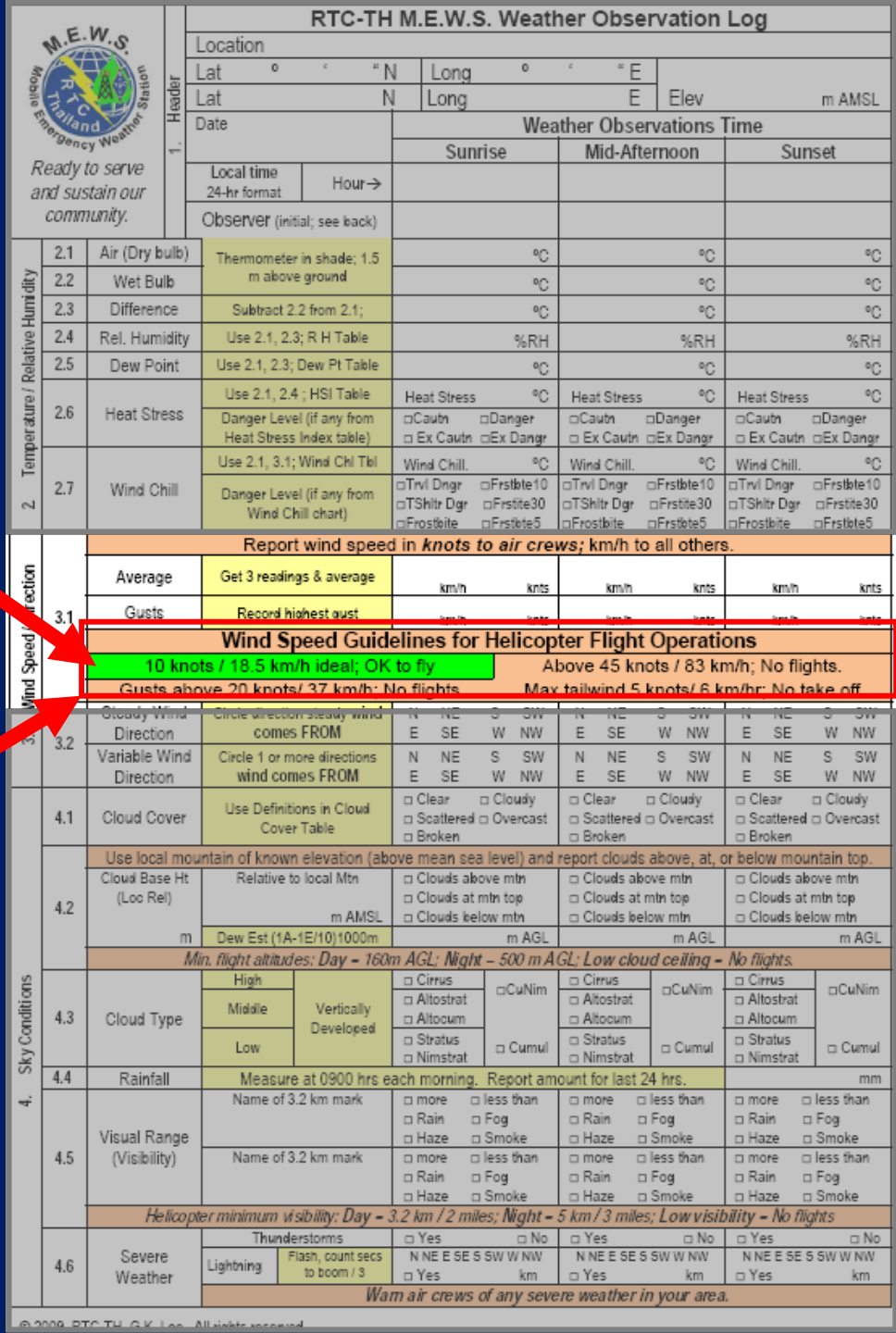

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	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly

Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights

Max tailwind 5 knots/ 6 km/hr; No take off

3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW

4. Sky Conditions

4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
4.2	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.				
	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	m AMSL / Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
	Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.				
4.3	Cloud Type	High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
	Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights				
4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning; Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
	Warn air crews of any severe weather in your area.				

You can use a wind speed gauge to measure the wind.

Note: This one is marked in miles per hour. Use the conversion table to get knots.

See Handbook:
Conversion table on p. 19

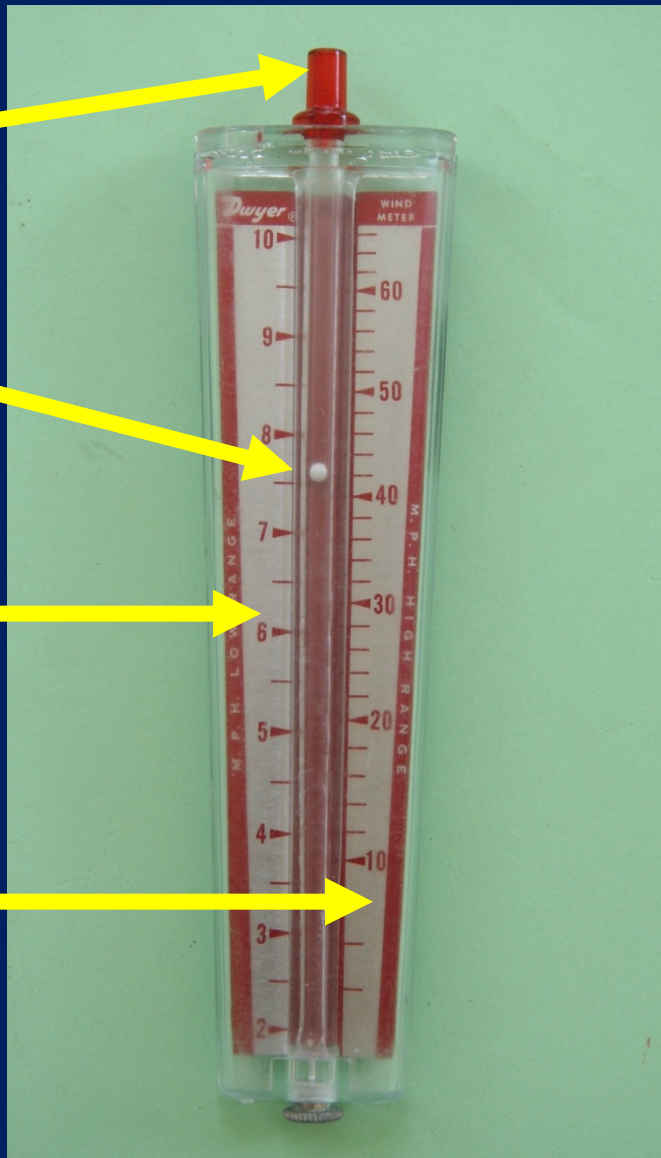
Parts of the wind speed gauge.

Speed range adjusting tube

Indicator ball

Low speed scale

High speed scale



You need to use the reference table to get the wind speed in kilometers per hour (km/h) and knots.

Wind Speed Conversion Table								
mph	km/h	knots	mph	km/h	knots	mph	km/h	knots
1	1.61	0.869	9	14.48	7.821	45	71.42	39.10
2	3.22	1.738	10	16.09	8.69	50	80.47	43.45
3	4.83	2.607	15	24.14	13.03	55	88.51	47.79
4	6.44	3.476	20	32.19	17.38	60	96.56	52.14
5	8.05	4.345	25	40.23	21.72	65	104.60	56.48
6	9.66	5.214	30	48.28	26.07	70	112.70	60.83
7	11.27	6.083	35	56.33	30.41	75	120.70	65.17
8	12.87	6.592	40	64.37	34.76	80	128.70	69.52
Report wind speeds in knots to air crews.								
Wind Speed Guidelines for Helicopter Flight Operations								
10 knots / 18.5 km/h ideal; OK to fly						Above 45 knots / 83 km/h; No Flights		
Gusts above 20 knots / 37 km/h; No Flights						Max tailwind 5 knots / 6 km/h; No take off.		
Advise air crews when wind velocities approach guideline limits.								

Flight crews tend to use knots (nautical miles per hour) to report wind speed.

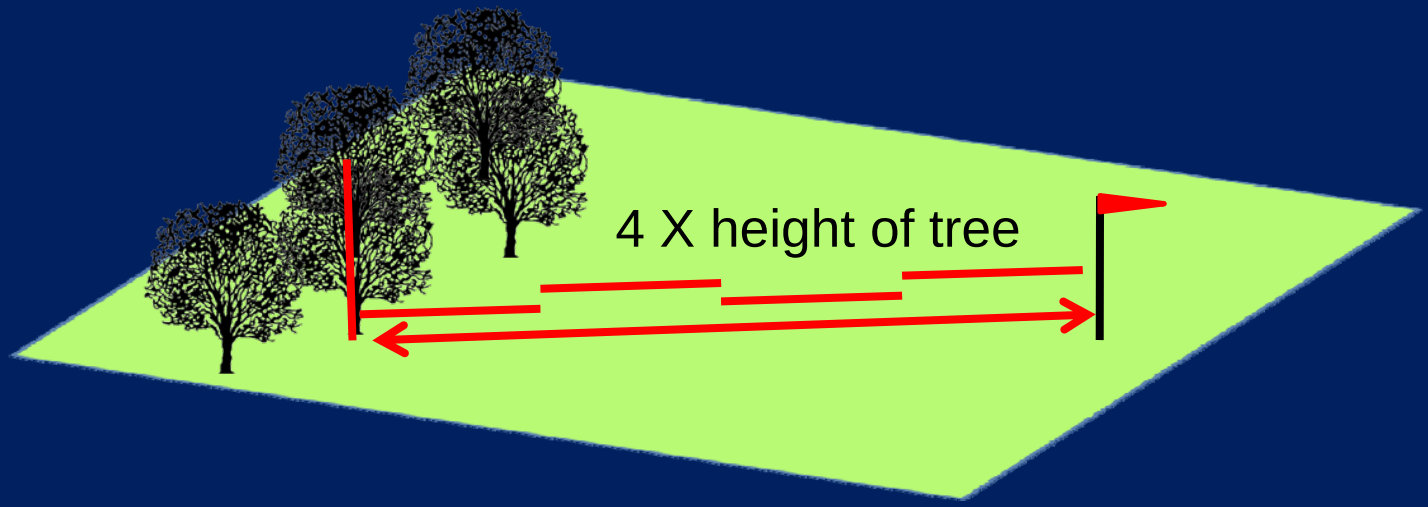
See Handbook: Conversion table on p. 1p

There are 5 steps to measuring the wind speed.

Step 1. Get in an open area away from buildings and trees

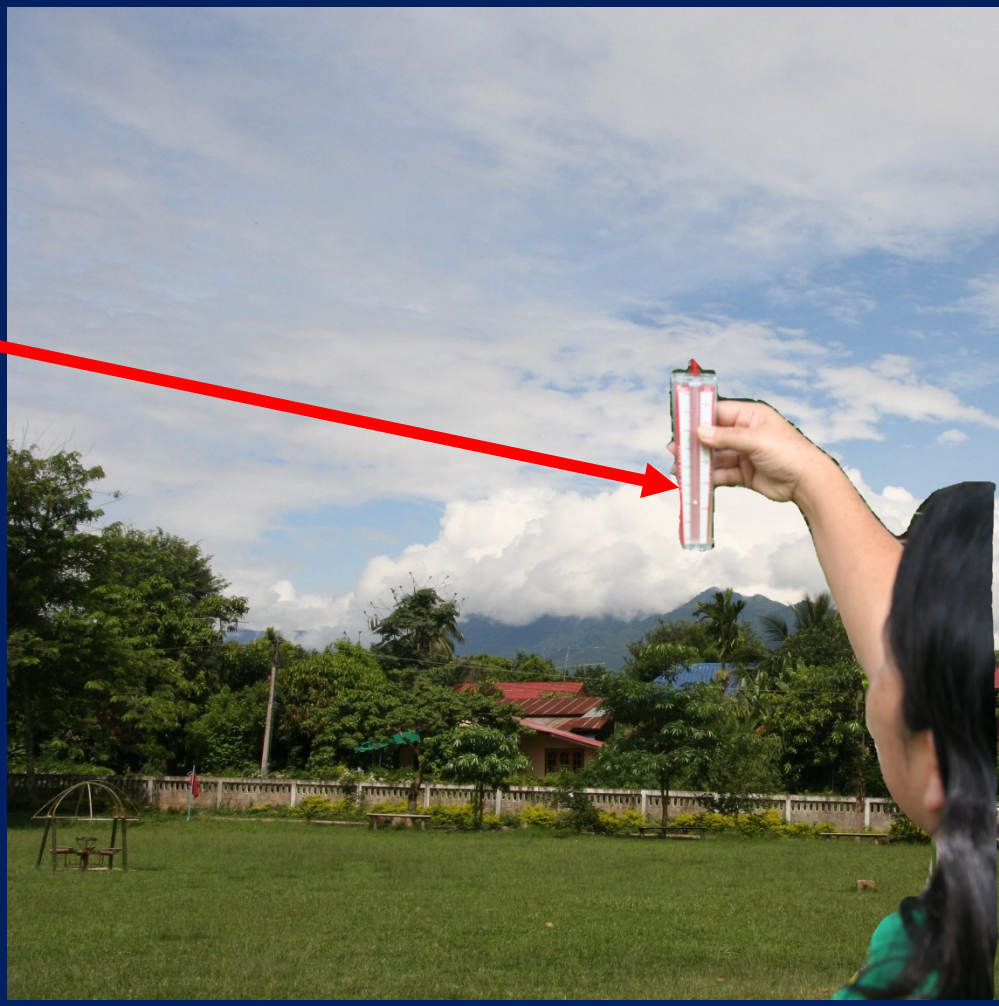
An open area away from buildings and trees means

A distance equal to 4 times the height of the tree or building



Step 2. Stand facing into the wind. Hold the wind speed gauge away from your body and above your head.

Step 3.
Watch the white ball as the wind blows. Use the appropriate wind speed scale.



Step 4. Record the highest and lowest wind speeds you see. Calculate the average speed.

You may want to review MEWS Lesson B2 about basic wind estimating as a back-up skill in case wind speed measuring equipment fails.

Step 5. Convert the wind speed from miles per hour to kilometers per hour and knots using the reference table.

Wind Speed Conversion Table									
mph	km/h	knots		mph	km/h	knots		mph	km/h	knots
1	1.61	0.869		9	14.48	7.821		45	71.42	39.10
2	3.22	1.738		10	16.09	8.69		50	80.47	43.45
3	4.83	2.607		15	24.14	13.03		55	88.51	47.79
4	6.44	3.476		20	32.19	17.38		60	96.56	52.14
5	8.05	4.345		25	40.23	21.72		65	104.60	56.48
6	9.66	5.214		30	48.28	26.07		70	112.70	60.83
7	11.27	6.083		35	56.33	30.41		75	120.70	65.17
8	12.87	6.592		40	64.37	34.76		80	128.70	69.52
Report wind speeds in knots to air crews.										
Wind Speed Guidelines for Helicopter Flight Operations										
10 knots / 18.5 km/h ideal; OK to fly							Above 45 knots / 83 km/h; No Flights			
Gusts above 20 knots / 37 km/h; No Flights							Max tailwind 5 knots / 6 km/h; No take off.			
Advise air crews when wind velocities approach guideline limits.										

Air crews use knots when reporting wind speed.

The chart is in the MEWS Handbook, p. 19

Emergency Back-up

Plan B: In case your wind speed gauge is damaged, you can go back to the Basic MEWS lesson B1 method of using the Modified Beaufort Wind Table

See Handbook p. 18

Beaufort Wind Table for Land Effects

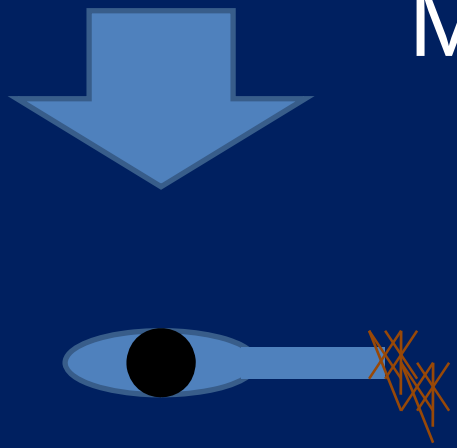
MEWS weather observers should set up a flag near their operating position. Use the Description and flag references to estimate the wind speed. Report the range of wind speeds from the chart rather than a specific number.

Description	Flag	WMO term	Mph	Km/ hr	Knots	Force	Psu lbs/sq ft (Kg/sq m)
			Report wind speed in knots to flight crews				
Calm; smoke rises vertically	---	Calm	<1.0	<1.5	<0.9	0	0.006266 (0.003059)
Smoke indicates wind; flag hangs limp, wind vanes do not move		Light Air	1-3	1.5-6	1-3	1	0.02924 (.01428)
Wind felt on face, leaves rustle, flag stirs, wind vanes move		Light breeze	4-7	6-12	4-6	2	0.142 (0.6934)
		5 Knots maximum tailwind for helicopter take-off					
Leaves and twigs in constant motion; flag occasionally extends		Gentle Breeze	8-12	12-20	7-10	3	0.3759 (1.835)
		10 Knots ideal for helicopter flight operations					
Dust and paper fly; small branches move; Flag flaps		Mild Breeze	13-18	21-29	11-16	4	0.8145 (3.977)
Small leafy trees begin to sway; white crested wavelets appear on lakes/ponds; Flag ripples		Fresh Breeze	19-24	30-39	17-21	5	1.504 (7.342)
		20 Knots maximum gusts for helicopter flight operations					
Large branches move; wires whistle; umbrellas hard to use; Flag snaps		Strong Breeze	25-31	40-50	22-27	6	2.485 (12.13)
Whole trees sway; hard to walk; Flag extended		Near Gale	32-38	51-61	28-33	7	3.822 (18.66)
Twigs and small branches broken; cars veer on roads; Flag tatters		Gale	39-46	62-74	34-40	8	5.597 (27.33)
Slight structural damage occurs (roof shingles blow off)		Strong Gale	47-54	75-87	41-47	9	7.769 (37.93)
		45 Knots maximum winds for helicopter flight operations					
Trees broken or uprooted, considerable damage to buildings		Storm	55-63	88-101	48-55	10	10.53 (51.39)
Wide spread damage caused	---	Violent Storm	64-72	02-114	56-63	11	13.78 (67.3)
	---	Hurricane	>73	>115	>63	12	>13.78 (>57.3)

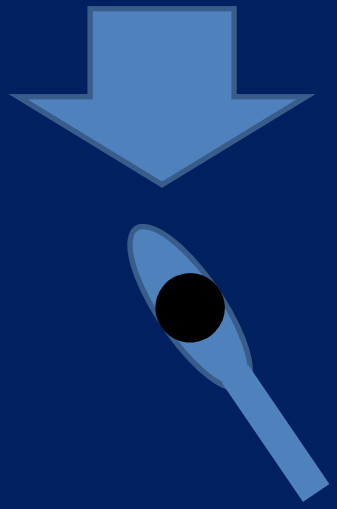
Disclaimer: Use of the pressure data to calculate tower/antenna wind loads is at your own risk. The RTC-TH and HS0ZHM assume no liability for the use of this data. Pressure values are the upper limits for a wind category.

Emergency Back-up

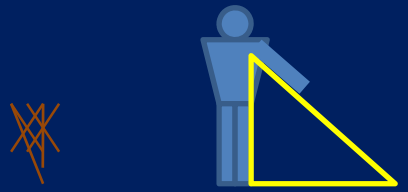
Plan C: In case your Modified Beaufort Wind Table is lost or destroyed, you can estimate wind speed by the “Drop Grass Method”



Stand facing the wind. Hold dry dead grass in your hand with an outstretched arm. Drop the grass.

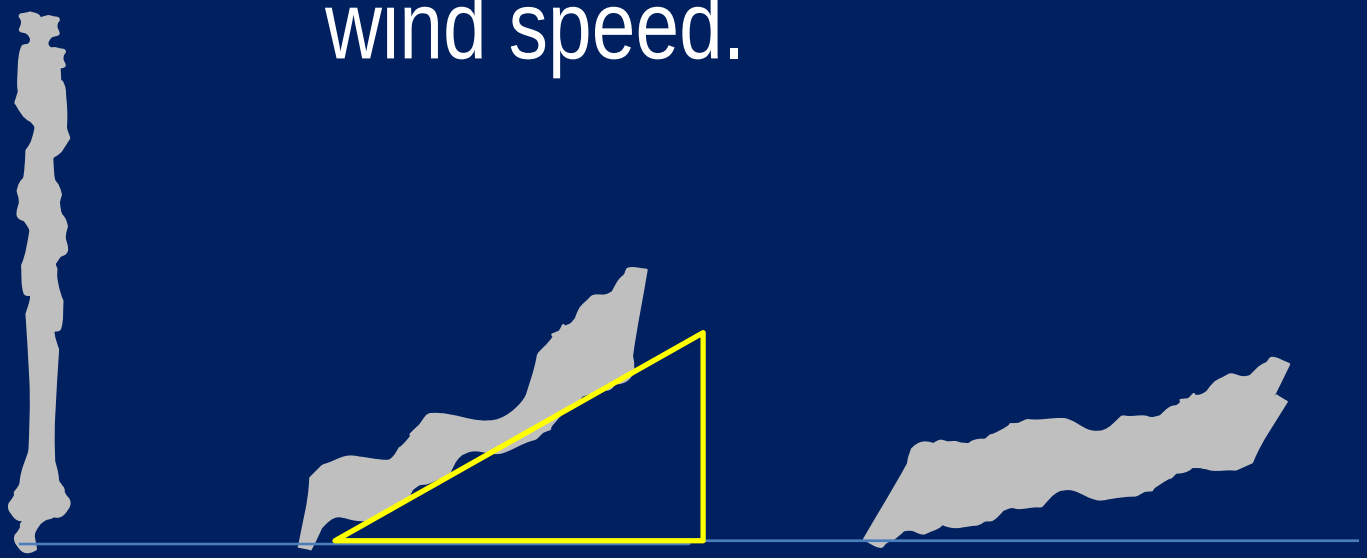


Stand and use your arm to point to where the grass fell to the ground. Measure the angle between your arm and arm. Divide the angle by 4 to get the estimated wind speed in knots.



Emergency Back-up

Plan D: In case your Modified Beaufort Wind Table is lost or destroyed and / or you lost an arm, you can use the angle of a smoke plume to estimate the wind speed.



Straight up = 0

30°= 3-5 knots

along the ground = more than 8 knots

Important Note

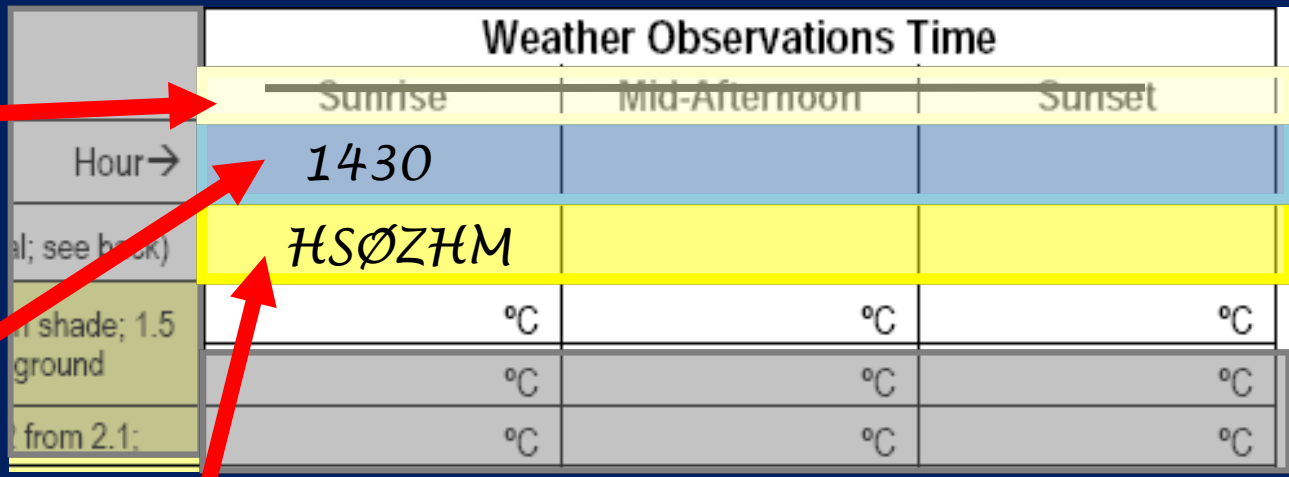
Normally MEWS observations are made 3 times a day. However, if flight operations are in progress, try to provide flight crews with weather updated prior to landings and take-offs for flight safety.

Issue a Flight Advisory Immediately at the first sign of a winds approaching limits that affect flight operations.

For flight operations, make and report observations to flight crews before landings and take-offs

Cross out the headings for Sunrise, Mid-Afternoon, Sunset

Record the specific local time of your observations



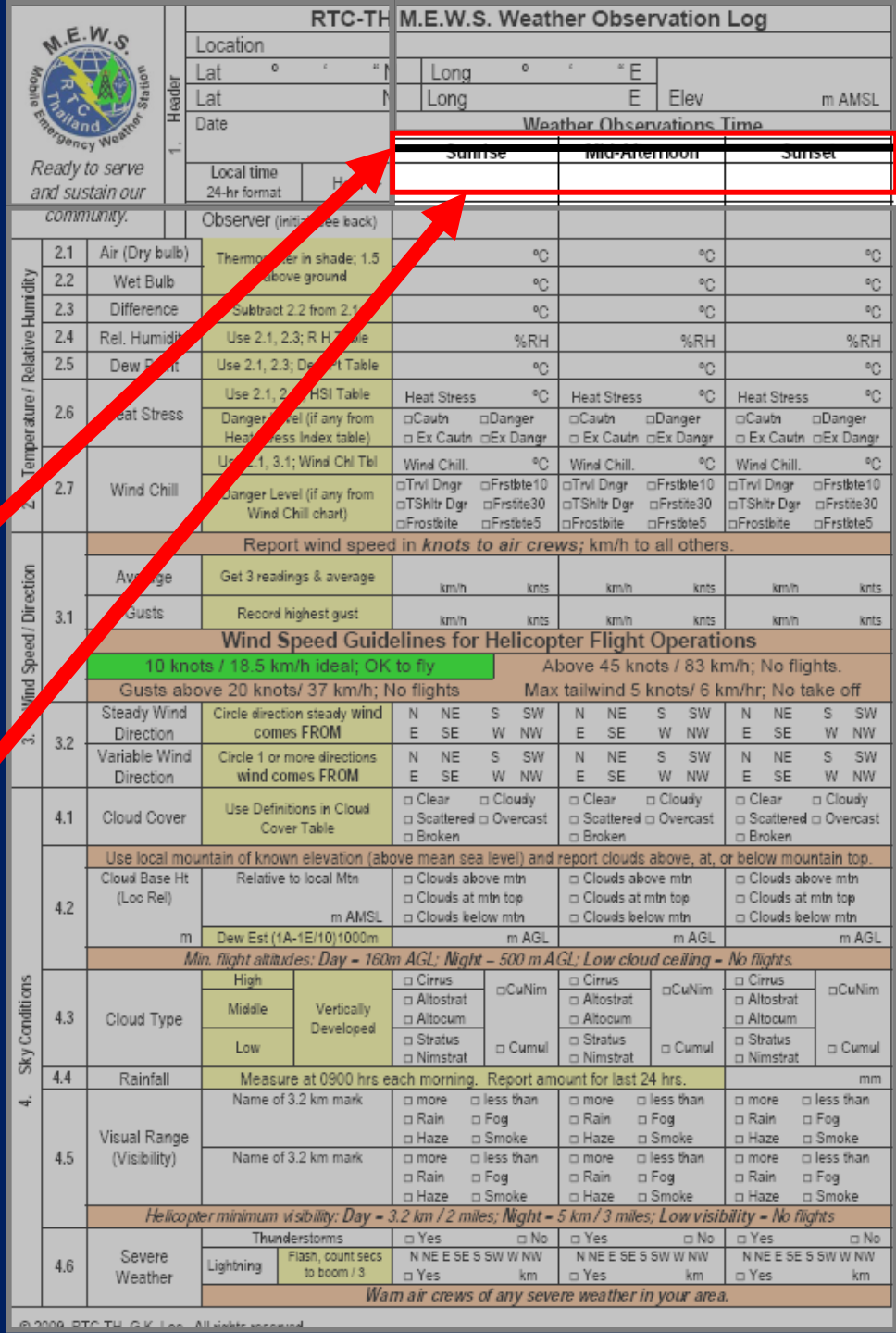
If a HAM, print your call sign (or name if no call sign)

Record wind speeds in Section 3.1

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

If more frequent observations are done to support flight operations...

…cross out the headings “Sunrise”, etc. and record the time of the observations in the space provided.



For flight operations, make and report observations to flight crews before landings and take-offs

Advanced Weather Reports for Flight Crews

- 2.1 Temperature
- 2.4 Relative Humidity
- 3.1 Wind Speed
- 3.2 Wind Direction
- 4.1 Cloud Cover
- 4.2 Cloud Base Height
- 4.3 Cloud Type
- 4.4 Rainfall
- 4.5 Visual Range
- 4.6 Severe Weather

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

Wind Chill

Most people think about wind chill and winter weather.

Photos from the Internet; educational fair use clause

But for disaster survivors who are wet, with little shelter, the combined effects of wind + rain, or high humidity makes them feel colder than normal.

Low temperatures and high winds in mountain areas…

…can make it feel colder. People can be more stressed and uncomfortable

The amount of danger can be determined knowing the wind chill factor.

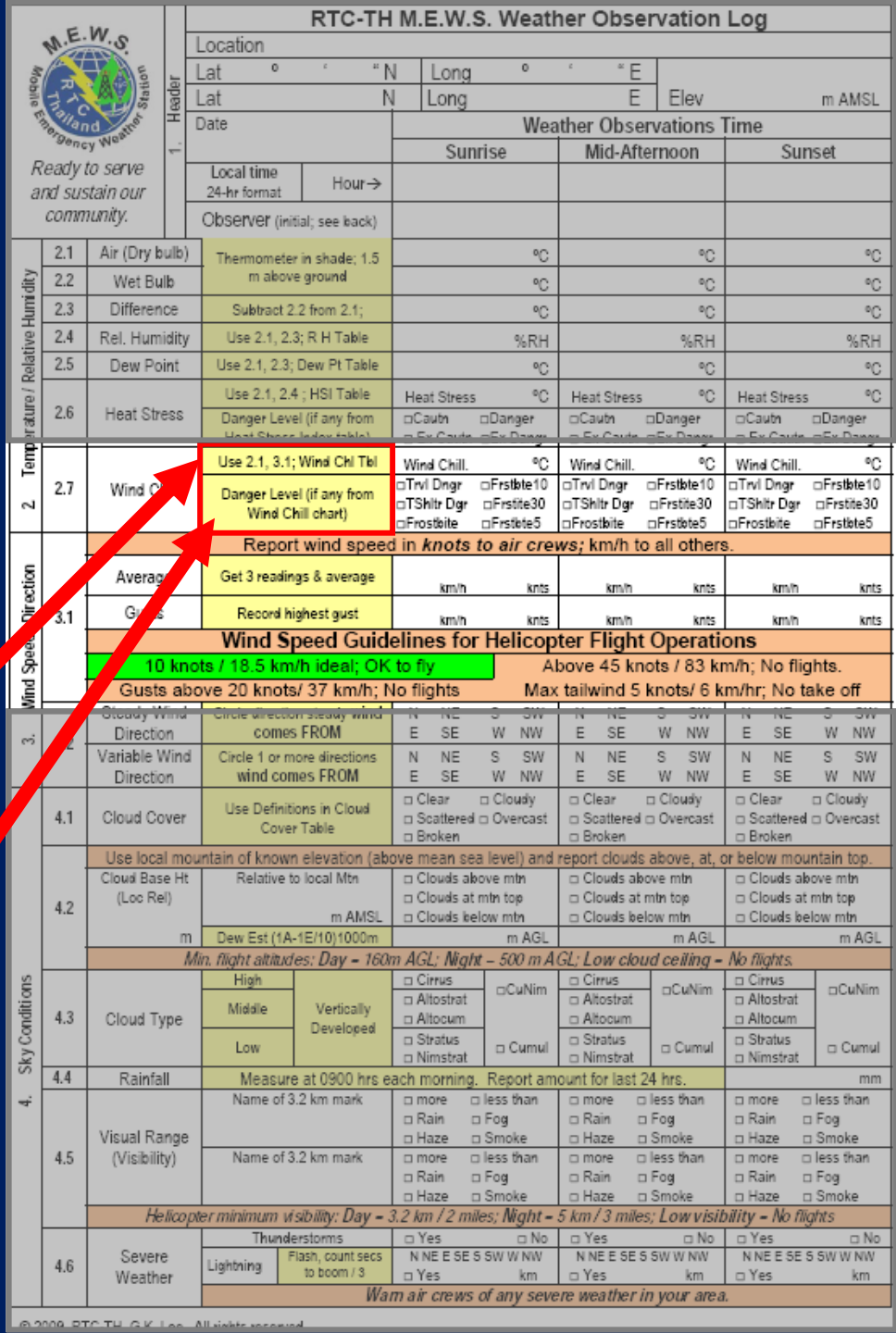
Photos from the Internet; educational fair use clause

Wind Chill is recorded in Section 2.7

Guide notes are on the front of the form

Use 2.1, 3.1; Wind Chill Table

Danger Level (if any from Wind Chill Table)



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Weather Observations Time

		Sunrise	Mid-Afternoon	Sunset
Local time 24-hr format	Hour→			
Observer (initial; see back)				
2.1 Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2 Wet Bulb		°C	°C	°C
2.3 Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4 Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5 Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6 Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
	Danger Level (if any from Heat Stress Index table)	☐Cautn ☐Danger ☐Ex Cautn ☐Ex Danger	☐Cautn ☐Danger ☐Ex Cautn ☐Ex Danger	☐Cautn ☐Danger ☐Ex Cautn ☐Ex Danger
2.7 Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
	Danger Level (if any from Wind Chill chart)	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5

Report wind speed in *knots to air crews;* km/h to all others.

3.1 Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly

Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights

Max tailwind 5 knots/ 6 km/hr; No take off

3.2 Steady Wind Direction	Circle direction steady wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
4.1 Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

4.2 Cloud Base Ht (Loc Rel)	Relative to local Mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
m	m AMSL / Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL

Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.

4.3 Cloud Type	High / Middle / Low — Vertically Developed	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul
4.4 Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5 Visual Range (Visibility)	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke

Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights

4.6 Severe Weather	Thunderstorms	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	Lightning / Flash, count secs to boom / 3	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km

Warn air crews of any severe weather in your area.

Additional brief notes are on the back of the form

Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook.

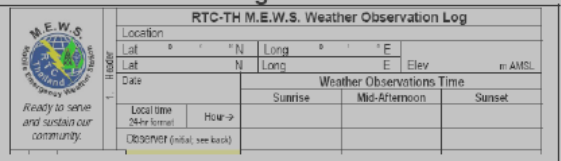
See MEWS Handbook: Section 2.7, p. 15-16

All weather observers write their initials and clearly print their name using block letters

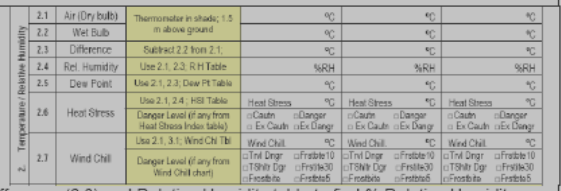
M.E.W.S. Summary Weather Observation Log Instructions

Header

Location: Local Place Name
Latitude, Longitude from GPS, survey records or map measurement.
Elevation: Survey records or map measurement (GPS elevations are not reliable).
Date/Hour: Use local Thai standard time in 24-hour format.
Observer: initials in box. Full name (print clearly) on top/back of form



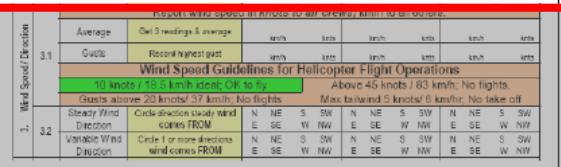
Temperature / Relative Humidity



2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.
2.2 Wet Bulb Temp from hyrgrometer kept in the shade, 1.5 m above the ground.
2.3 Difference between Dry and Wet Bulb temperatures.
2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.
2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.
2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.

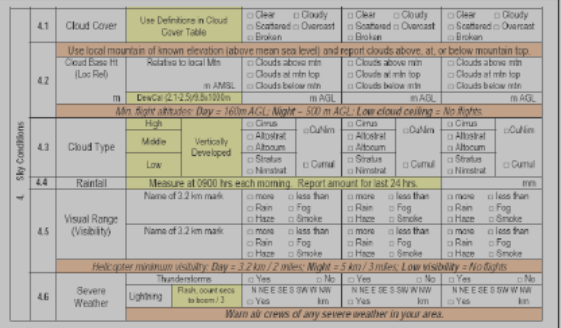
2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Wind Speed / Direction



3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. *Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.*
3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions.

Sky Conditions

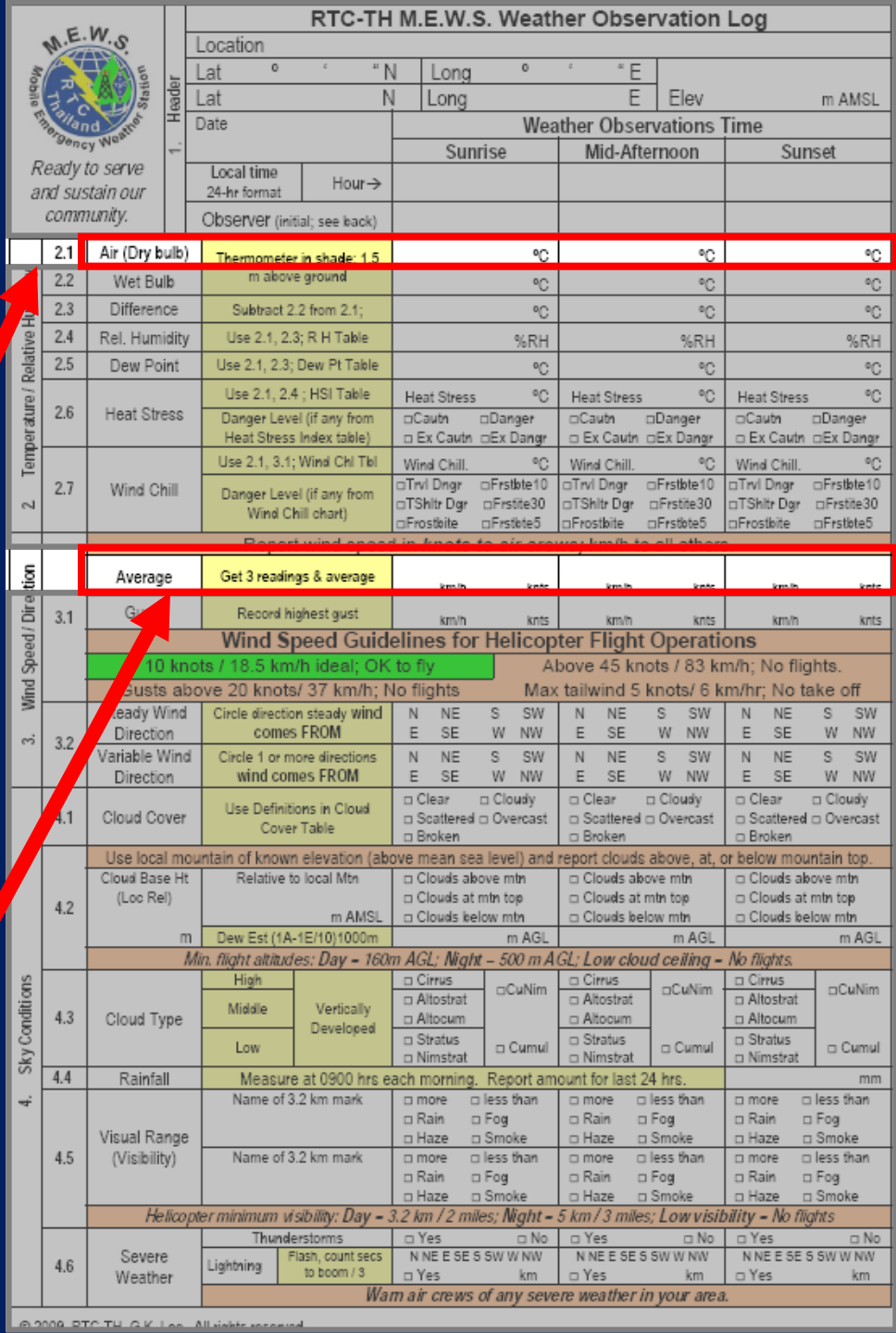


4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.
4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 9.8; multiply quotient by 1000m. *Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.*
4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book
4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects, with top of gauge 50 cm above ground to avoid splash water from entering gauge.
4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less than the known distances to these landmarks. *Advise air crews when visual range is close to affecting helicopter flight operations.* Check appropriate boxes for reasons of reduced visibility.
4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, divide by 3 = approximate distance in km. Circle direction to storm.

If you know the air temperature and wind speed, you can look up the wind chill

You will need the MEWS log form with air and wind data, a calculator, pencil, the MEWS handbook, and a wind chill table.

Step 1: Get the recorded air temperature (Section 2.1) and the recorded wind speed in Section 3.1 of the Log Form



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Weather Observations Time

			Sunrise	Mid-Afternoon	Sunset
1. Header		Local time 24-hr format / Hour→			
		Observer (initial; see back)			
2. Temperature / Relative Hy	2.1	Air (Dry bulb) — Thermometer in shade: 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb	°C	°C	°C
	2.3	Difference — Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity — Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point — Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress — Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill — Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
3. Wind Speed / Direction		Average — Get 3 readings & average	km/h knts	km/h knts	km/h knts
	3.1	G… — Record highest gust	km/h knts	km/h knts	km/h knts
		Wind Speed Guidelines for Helicopter Flight Operations			
		10 knots / 18.5 km/h ideal; OK to fly		Above 45 knots / 83 km/h; No flights.	
		Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off	
	3.2	Steady Wind Direction — Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction — Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover — Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
		Cloud Base Ht (Loc Rel) — Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m AMSL — Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
		Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.			
	4.3	Cloud Type — High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
	4.4	Rainfall — Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility) — Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights			
	4.6	Severe Weather — Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
		Warn air crews of any severe weather in your area.			

Using the Wind Chill Factor

Step 2: Find the air temperature in top row. Let's use 0°C.

0°C would be about the air temp at the top of Doi Phu Kha in Jan.

See Handbook, p. 16 for the Wind Chill Table.

Wind Chill

Wind Velocity (km/h) \ Measured Air Temperature (°C)	5	0	-5	-10	-15	-20	-25	-30	-35	-40
0	5	0	-5	-10	-15	-20	-25	-30	-35	-40
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57
30	0	-7	-13	-20	-26	-33	-39	-46	-52	-59
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67

Travel can be dangerous
Use heated vehicles, temporary shelters are unsuitable and dangerous.

Frostbite within 30 minutes

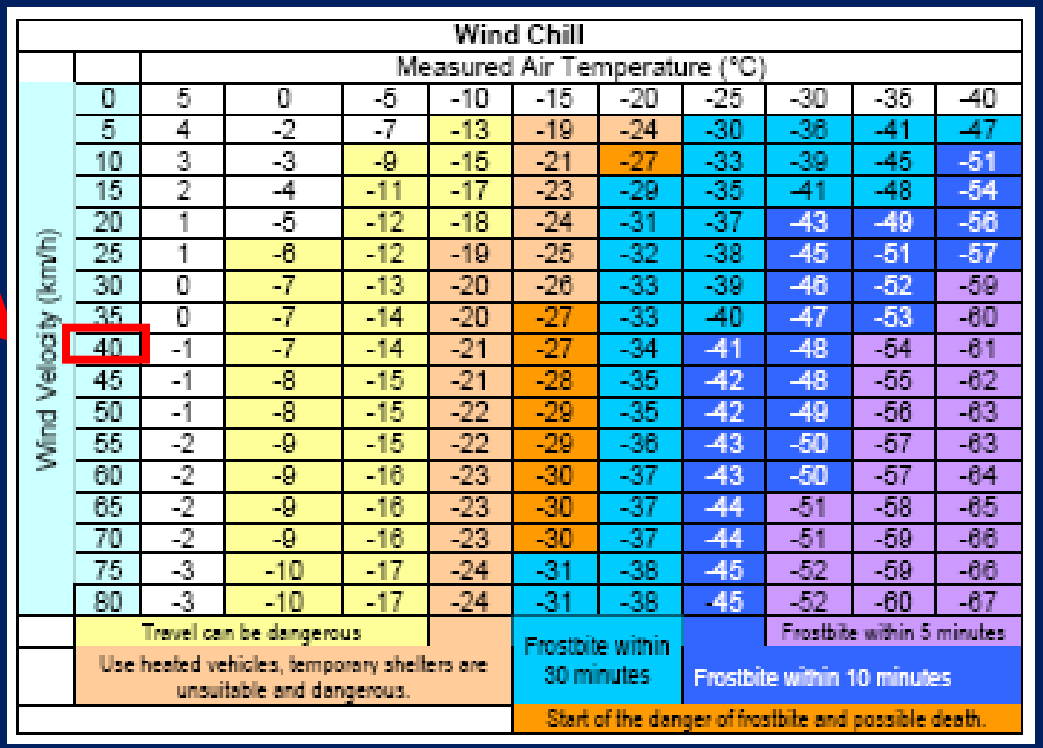
Frostbite within 5 minutes

Frostbite within 10 minutes

Start of the danger of frostbite and possible death.

Using the Wind Chill Table

Step 3: Find the wind speed in the left column. Let's use 40 km/h.



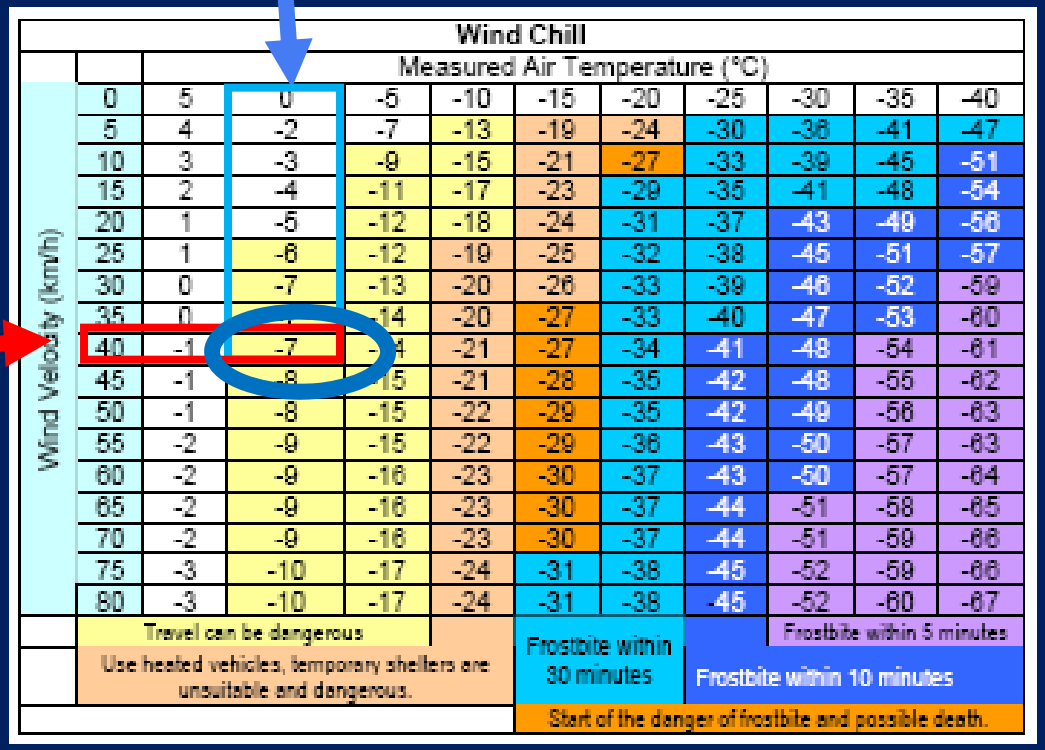
Wind Chill

Wind Velocity (km/h)	Measured Air Temperature (°C)									
	5	0	-5	-10	-15	-20	-25	-30	-35	-40
0	4	-2	-7	-13	-19	-24	-30	-36	-41	-47
5	3	-3	-9	-15	-21	-27	-33	-39	-45	-51
10	2	-4	-11	-17	-23	-29	-35	-41	-48	-54
15	1	-5	-12	-18	-24	-31	-37	-43	-49	-56
20	1	-6	-12	-19	-25	-32	-38	-45	-51	-57
25	0	-7	-13	-20	-26	-33	-39	-46	-52	-59
30	0	-7	-14	-20	-27	-33	-40	-47	-53	-60
35	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61
40	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62
45	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63
50	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63
55	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64
60	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
65	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66
70	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66
75	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67
80	Travel can be dangerous Use heated vehicles, temporary shelters are unsuitable and dangerous.				Frostbite within 30 minutes		Frostbite within 10 minutes	Frostbite within 5 minutes		
					Start of the danger of frostbite and possible death.					

Determining the Wind Chill Factor

Step 4: Read across the row and down the column into the chart (-7°C).

You will feel -7°C cooler than the measured air temperature



Wind Chill

Wind Velocity (km/h) \ Measured Air Temperature (°C)	5	0	-5	-10	-15	-20	-25	-30	-35	-40
0	5	0	-5	-10	-15	-20	-25	-30	-35	-40
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57
30	0	-7	-13	-20	-26	-33	-39	-46	-52	-59
35	0	[illegible]	-14	-20	-27	-33	-40	-47	-53	-60
40	-1	-7	[illegible]	-21	-27	-34	-41	-48	-54	-61
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67

Travel can be dangerous
Use heated vehicles, temporary shelters are unsuitable and dangerous.

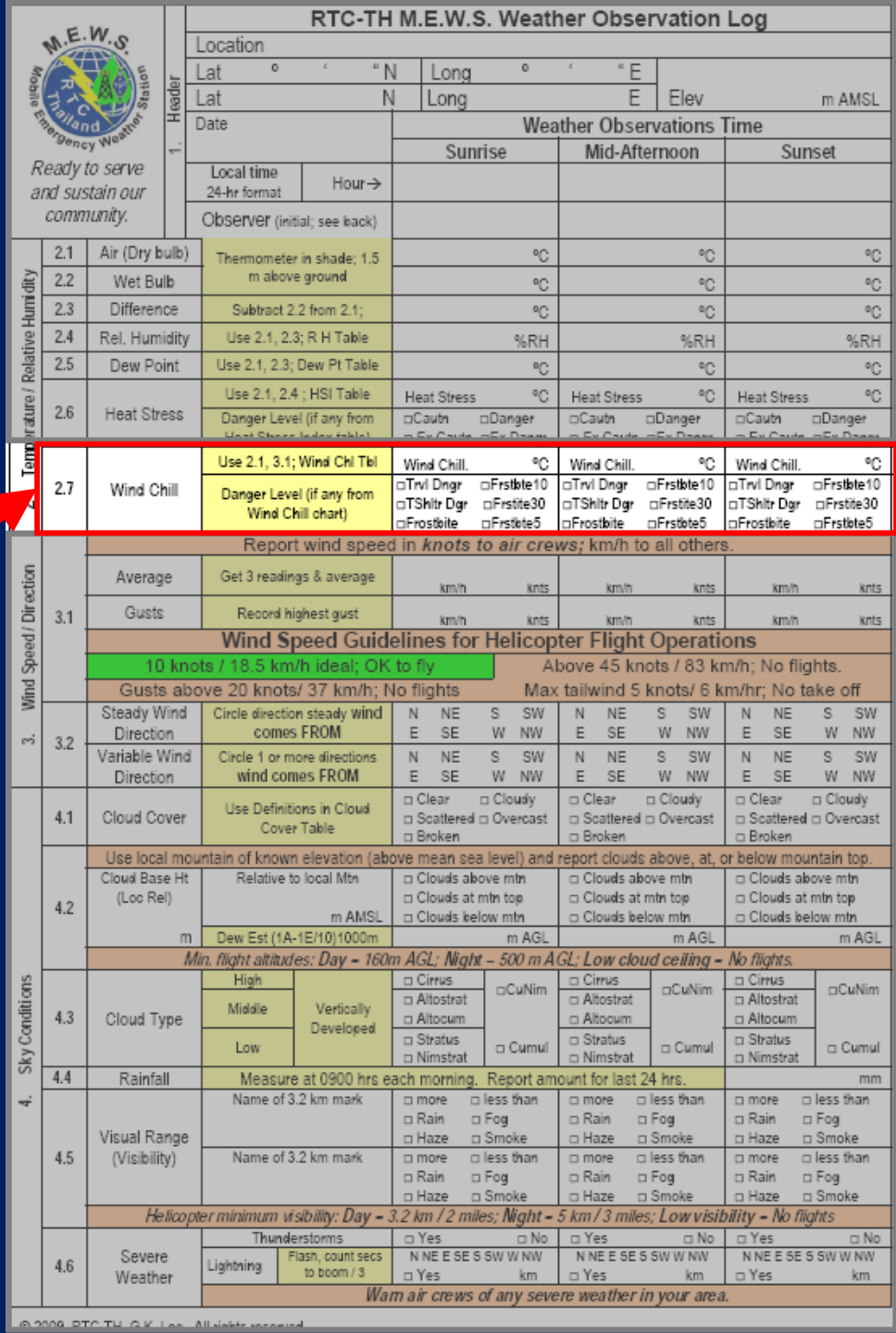
Frostbite within 30 minutes

Frostbite within 5 minutes

Frostbite within 10 minutes

Start of the danger of frostbite and possible death.

Record the Wind Chill in Section 2.7



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Local time 24-hr format Hour→

Observer (initial; see back)

			Weather Observations Time: Sunrise	Mid-Afternoon	Sunset
2. Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger	□Cautn □Danger	□Cautn □Danger
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstbite30 □Frostbite □Frstbite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstbite30 □Frostbite □Frstbite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstbite30 □Frostbite □Frstbite5
3. Wind Speed / Direction			Report wind speed in *knots to air crews;* km/h to all others.			
	3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
		Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
			Wind Speed Guidelines for Helicopter Flight Operations			
			10 knots / 18.5 km/h ideal; OK to fly	Above 45 knots / 83 km/h; No flights.		
			Gusts above 20 knots/ 37 km/h; No flights	Max tailwind 5 knots/ 6 km/hr; No take off		
	3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
			Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
			Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.			
	4.3	Cloud Type	High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning; Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
			Warn air crews of any severe weather in your area.			

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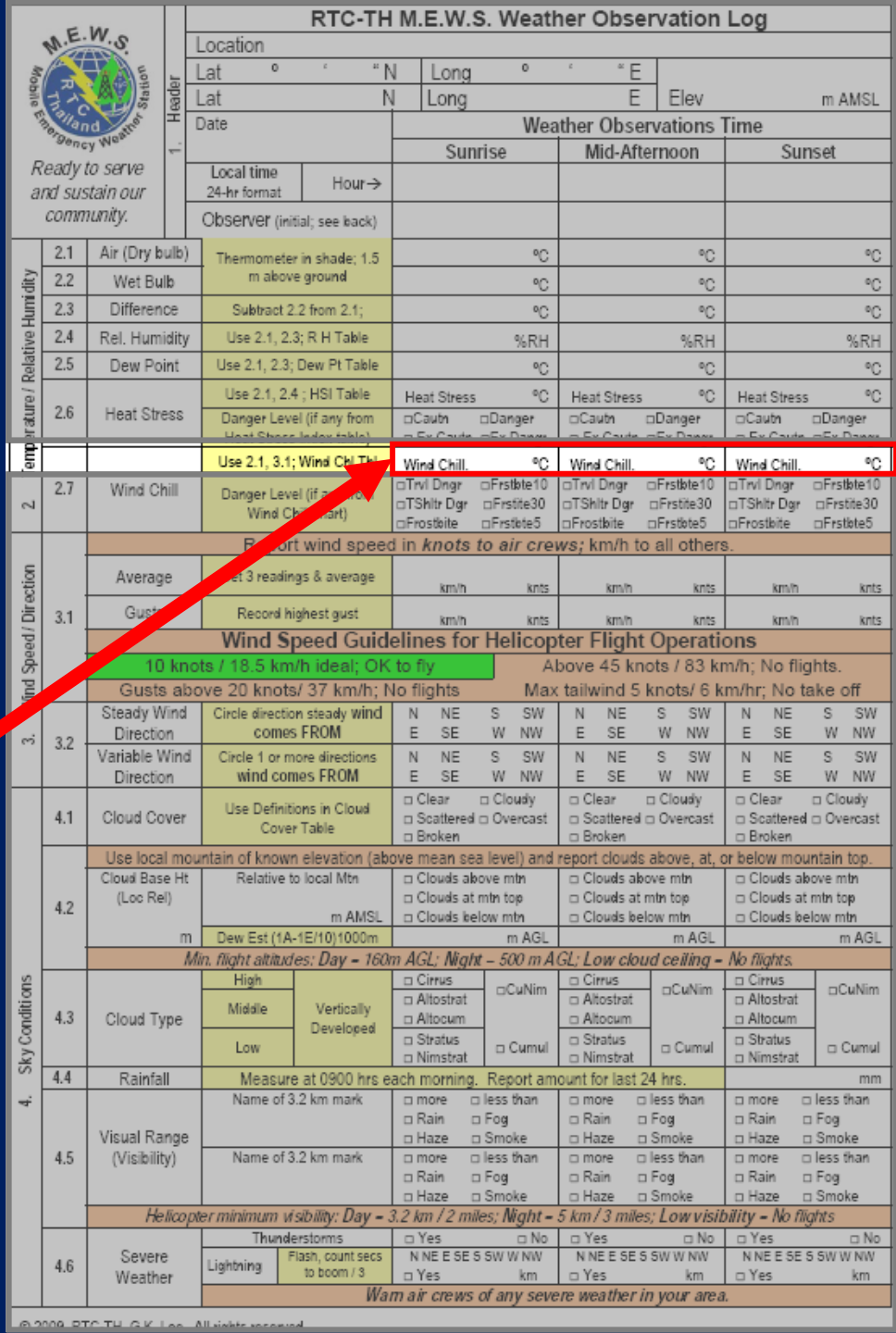
Record the Wind Chill temperature in the upper part of Section 2.7



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Local time 24-hr format Hour→

Observer (initial; see back)

				Weather Observations Time: Sunrise	Mid-Afternoon	Sunset
1. Header						
Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger	□Cautn □Danger	□Cautn □Danger
2.			Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
	2.7	Wind Chill	Danger Level (if any from Wind Chill Chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstite5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstite5
3. Wind Speed / Direction			Report wind speed in *knots to air crews;* km/h to all others.			
	3.1	Average	Last 3 readings & average	km/h knts	km/h knts	km/h knts
		Gust	Record highest gust	km/h knts	km/h knts	km/h knts
			Wind Speed Guidelines for Helicopter Flight Operations			
			10 knots / 18.5 km/h ideal; OK to fly		Above 45 knots / 83 km/h; No flights.	
			Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off	
	3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2	Cloud Base Ht (Loc Rel)	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
			Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	m AMSL / Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
			Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.			
	4.3	Cloud Type	High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning; Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
			Warn air crews of any severe weather in your area.			

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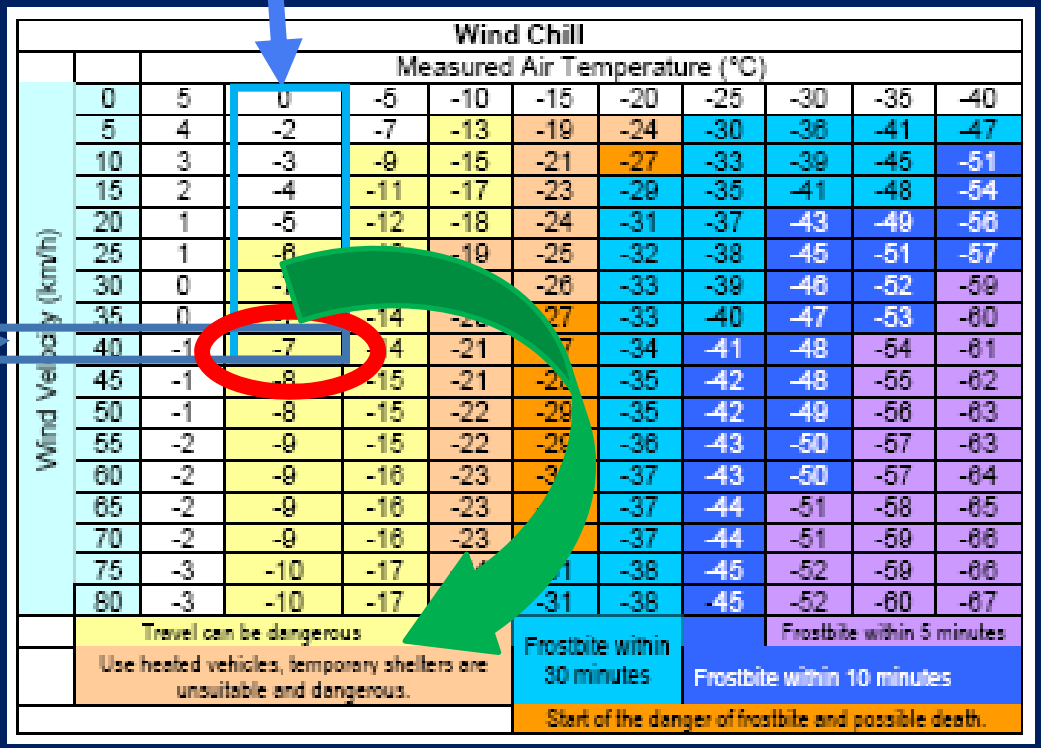
EmComm Emergency Communications — RTC-Thailand Rural Training Center-Thailand

Look for Wind Chill Warning

Step 5: Look at the color code and the relevant comments.

You will feel -7°C cooler than the measured air temperature



Wind Chill

Wind Velocity (km/h)	Measured Air Temperature (°C)										
	0	-5	-10	-15	-20	-25	-30	-35	-40		
0	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	
20	1	-5	-12	-18	-24	-31	-37	-43	-49	-56	
25	1	-6	-12	-19	-25	-32	-38	-45	-51	-57	
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	
55	-2	-9	-15	-22	-29	-36	-43	-50	-57	-63	
60	-2	-9	-16	-23	-30	-37	-43	-50	-57	-64	
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	
70	-2	-9	-16	-23	-30	-37	-44	-51	-59	-66	
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	

Travel can be dangerous

Use heated vehicles, temporary shelters are unsuitable and dangerous.

Frostbite within 30 minutes

Frostbite within 5 minutes

Frostbite within 10 minutes

Start of the danger of frostbite and possible death.

Record the Wind Chill Danger Level advisory (if any) in the lower part of Section 2.7

2 Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground		°C	°C	°C
	2.2	Wet Bulb			°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;		°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table		%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table		°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress	°C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr		□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill.	°C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5		□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

Check the appropriate box as needed. If no Danger Level exists, **cross out this section**

RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header

Location

Lat ° ' "N Long ° ' "E

Lat N Long E Elev m AMSL

Date

Local time 24-hr format Hour→

Observer (initial; see back)

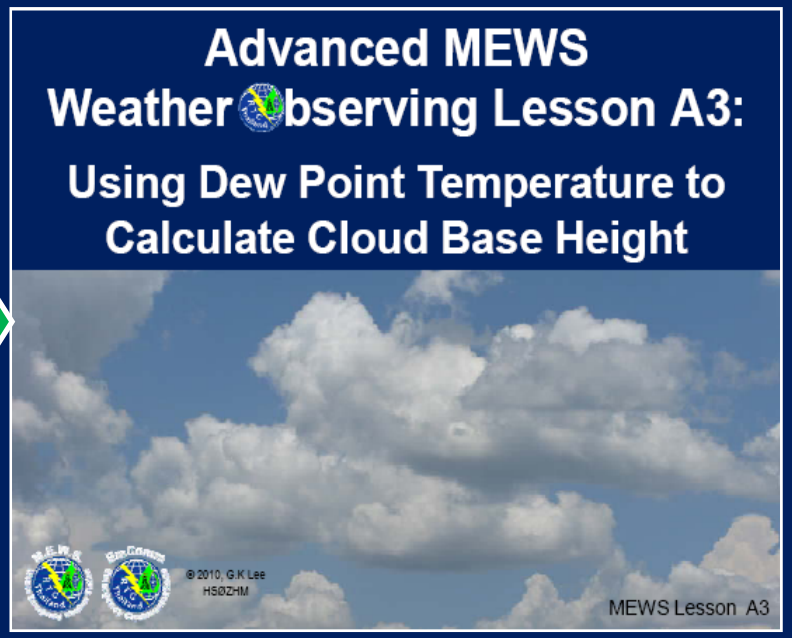
				Weather Observations Time: Sunrise	Mid-Afternoon	Sunset
2 Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbite10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
3. Wind Speed / Direction	3.1	Average	Get 3 readings & average	Report wind speed in *knots to air*; km/h to all others. knts	km/h knts	km/h knts
		Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
			Wind Speed Guidelines for Helicopter Flight Operations			
			10 knots / 18.5 km/h or less; OK to fly		Above 45 knots / 83 km/h; No flights.	
			Gusts above 20 knots / 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off	
	3.2	Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
			Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
	4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	m AMSL Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
			Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.			
	4.3	Cloud Type	High / Middle / Low; Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat; □CuNim □ Cumul
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning; Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
			Warn air crews of any severe weather in your area.			

Knowing the Wind Chill helps relief officials…

…better plan water, food, shelter, clothing and supplies needed for the emergency relief effort.

However, in most cases, weather information for the local disaster site may NOT available.
You can help fill the gap by learning about weather observing and/or becoming a licensed amateur radio operator.

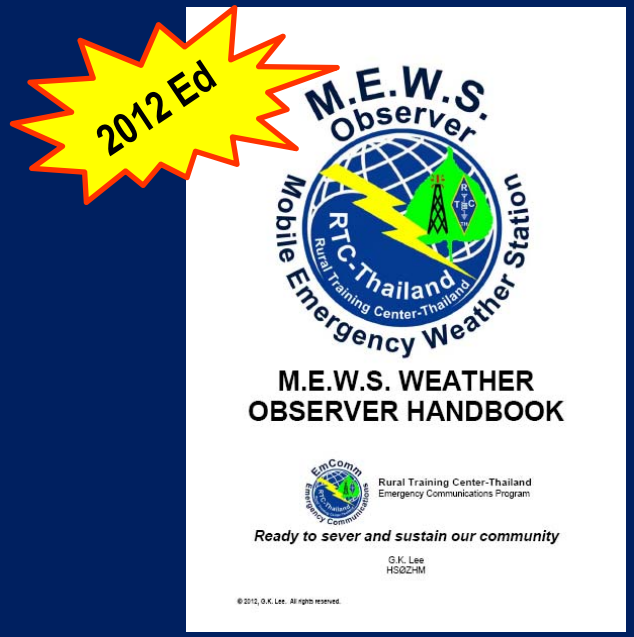
You have completed the Advanced MEWS Lesson A2: Measuring Wind Speed & Windchill



You are now ready for Advanced MEWS Lesson A3: Using Dew Point Temperature to Calculate Cloud Base Height

Questions or Comments

Refer to the MEWS Weather Observer Handbook for more details on any of the procedures in this lesson.

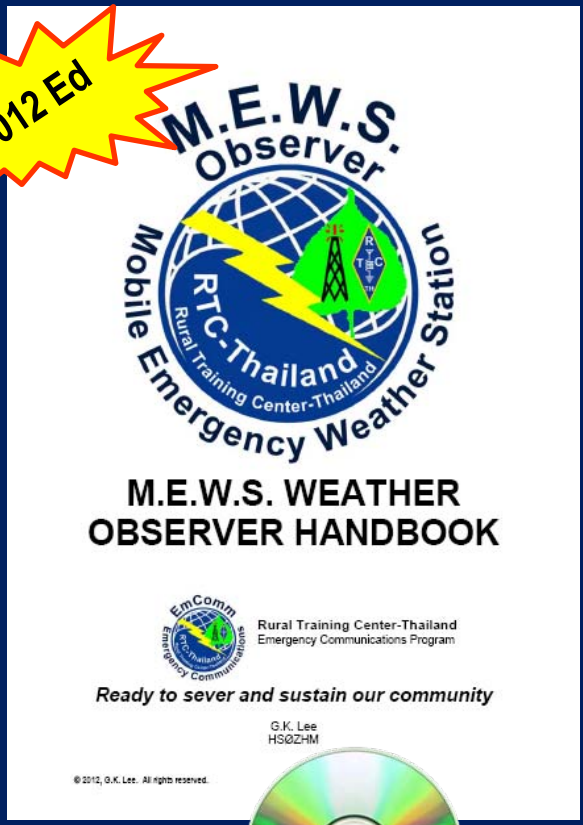


You may also contact us by e-mail:
hsØzhm@gmail.com
We are always trying to improve our lessons. Your comments and suggestions are welcomed.

Free Self-Study Materials by Internet

- RTC-TH Weather Observer manual
- Illustrated PDF topical lessons

2012 Ed



All of the lessons have been classroom and field proven.

Send e-mail to hsØzhm@gmail.com to request free training materials for non-commercial use only.

These materials are in English. Volunteer assistance for Thai translation to is welcome and will be acknowledged and cited.

Advanced MEWS PDF Lessons

A 1: Measuring Relative Humidity and Heat Stress

A 2: Measuring Wind Speed and Wind Chill

A 3: Using Dew Point Temperature to Calculate Cloud Base Height

A 4: Measuring Rainfall

A 5: Reporting Severe Weather

A 6: Weather Forecasting

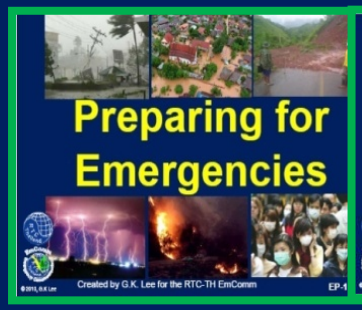
Be sure to check www.neighborhoodlink.com/RTC-TH_Tech/pages for the latest updated editions of MEWS lessons

Advanced MEWS PDF Lessons

2012 Ed

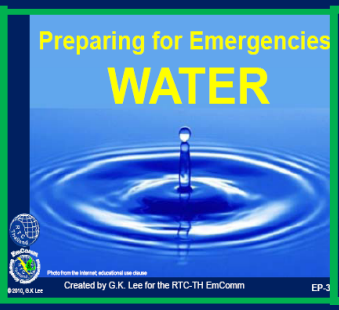
Six slide show lessons;
Some show how to build your own weather equipment

The EP Lesson Series



EP-1

EP-2



EP-3

EP-4

EP-5

EP-6

EP-7

EP-8

EP-9

EP-10

EP-11

EP-12

www.neighborhoodlink.com/RTC-TH_Tech/pages

For More Information about M.E.W.S.

Contact
Greg, HSØZHM
MEWS Creator / Mentor

Via E-mail
hsØzhm@gmail.com

Via Skype video
conference call: rtc_th

Community-based Environmental Education for

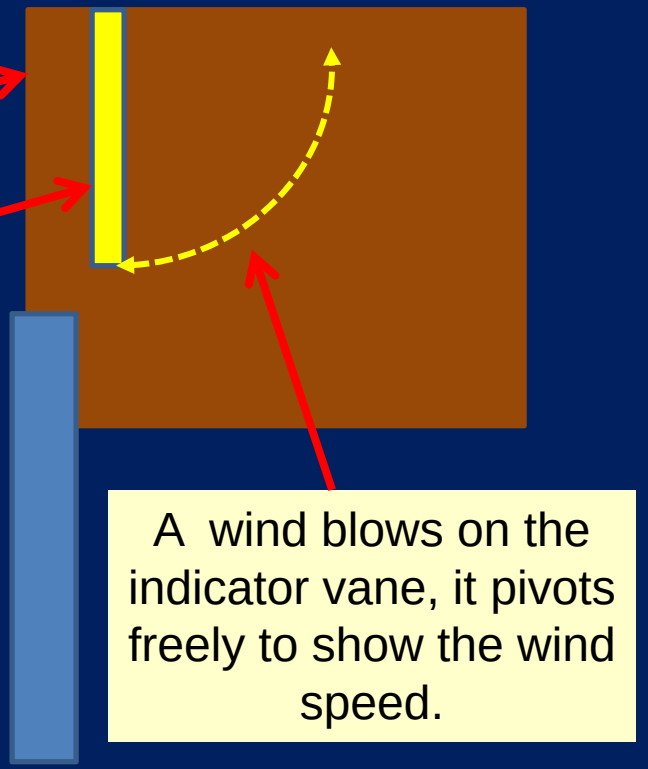
The End

Continue to learn how to make your own wind speed meter.

Making a Wind Speed Meter

Parts:

- Wood back board
- Wood Indicator vane
- PVC handle
- a nail
- 2-3 screws

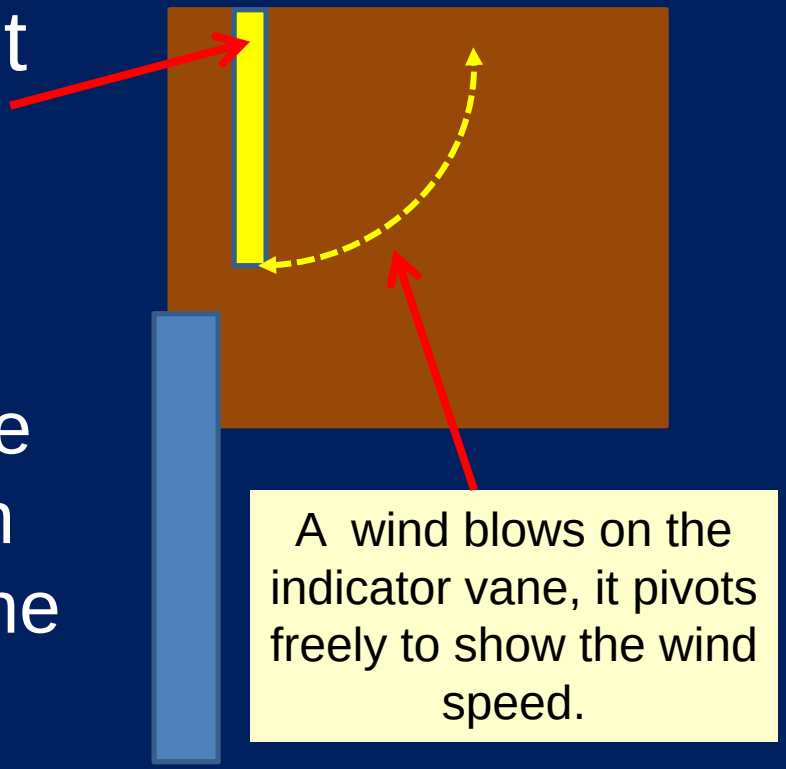


Use the nail for the indicator vane pivot.

Use the screws to attach the PVC handle to the back board.

Making a Wind Speed Gauge

The indicator vane pivot must swing freely.

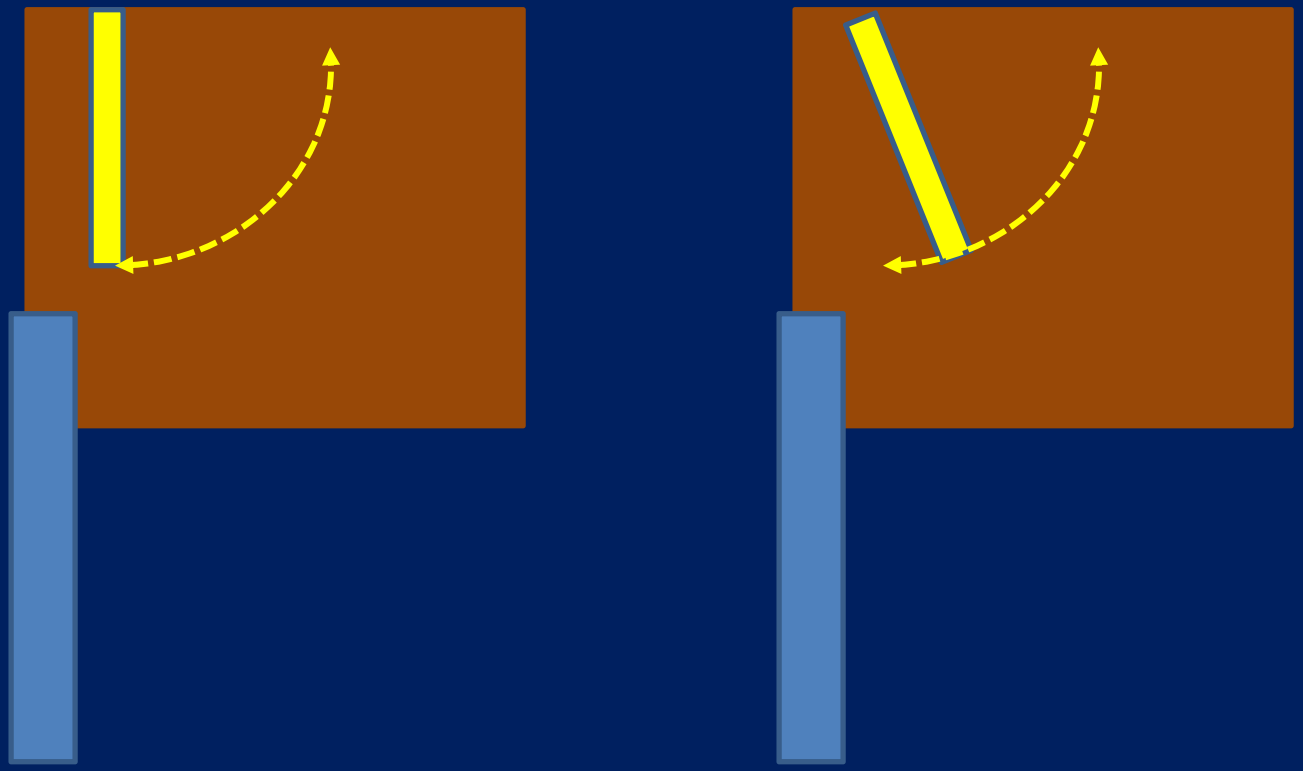


To make this happen:

- Drill a hole in the vane that is larger than the diameter of the nail.
- Put the nail through the vane, then pound the nail into the back board.

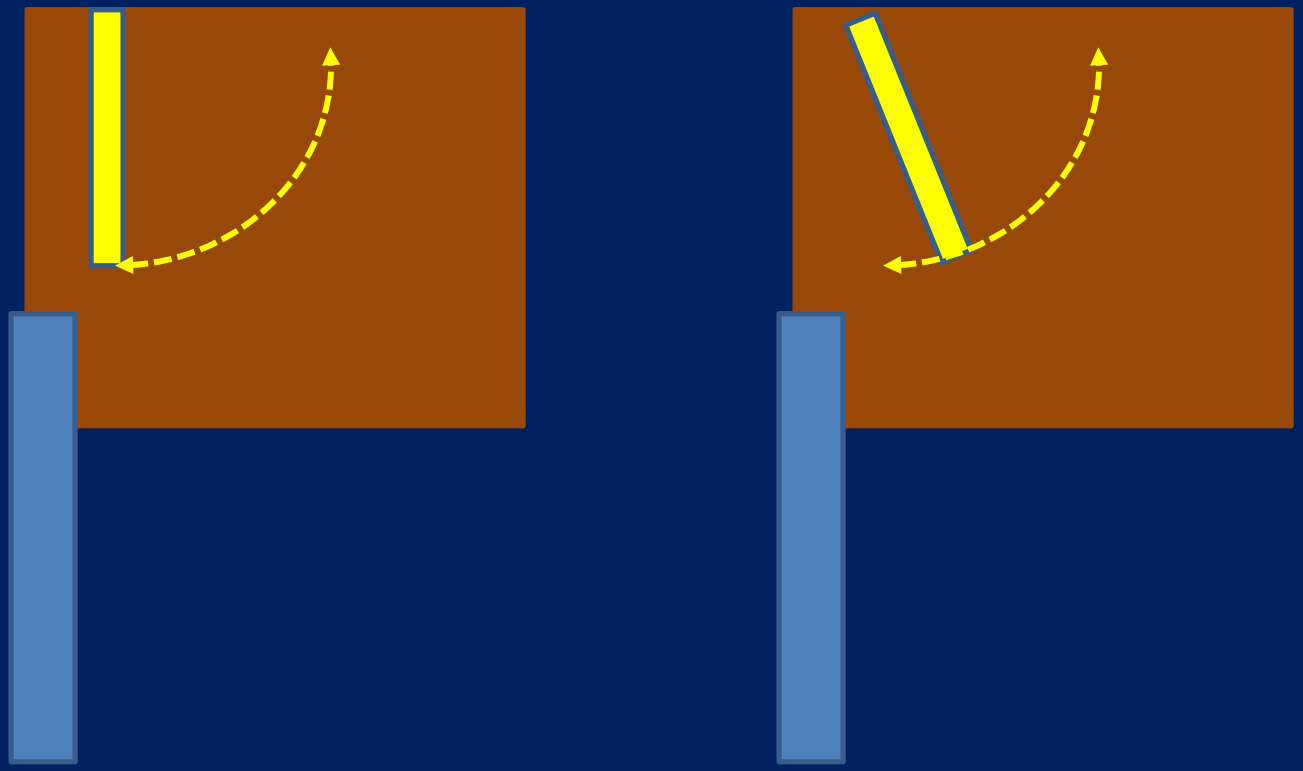
Making a Wind Speed Gauge

Ride in a car. Hold the wind speed gauge out the window open. Have the driver go at 5 km/h. Mark the location of front edge of the indicator vane. Repeat this to get a good reading for 5 km/h.



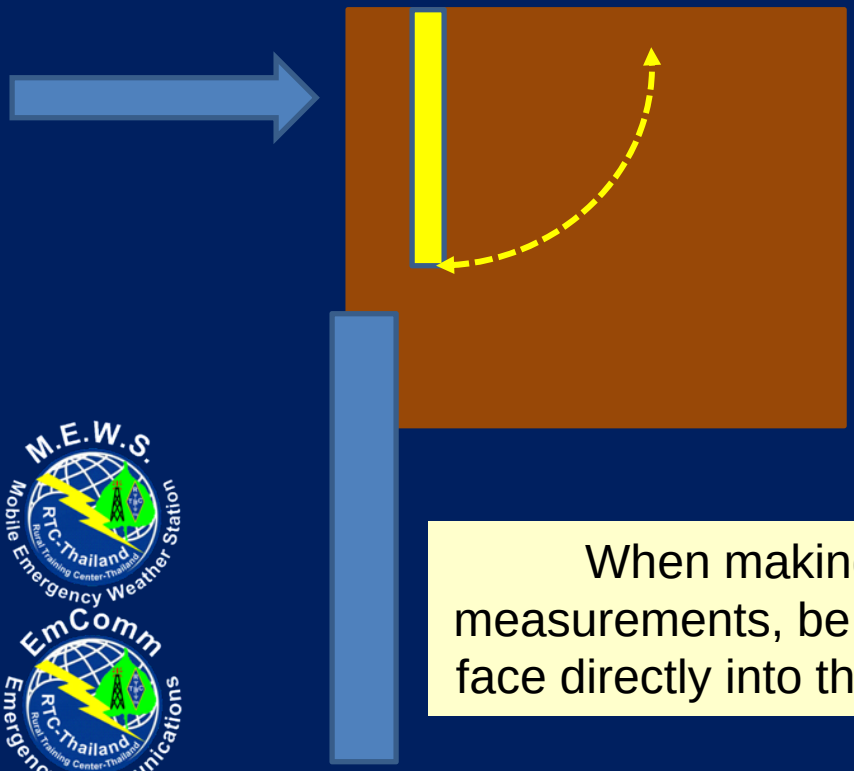
Making a Wind Speed Gauge

Repeat this process but increase the car speed by 5 km/h to at least 75 km/h. Get 3 readings at each speed to be sure of the reference mark.

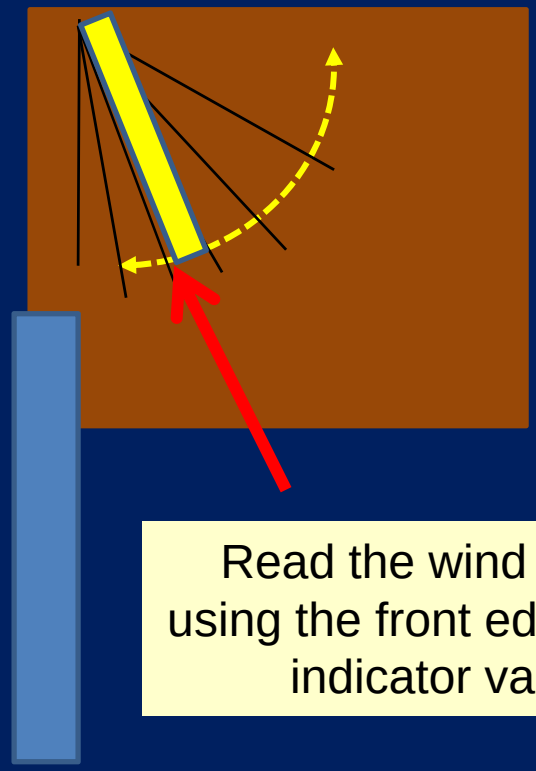


Making a Wind Speed Gauge

When you are done, carefully use a permanent marker to draw the wind speed scale on the back board. The label the lines.

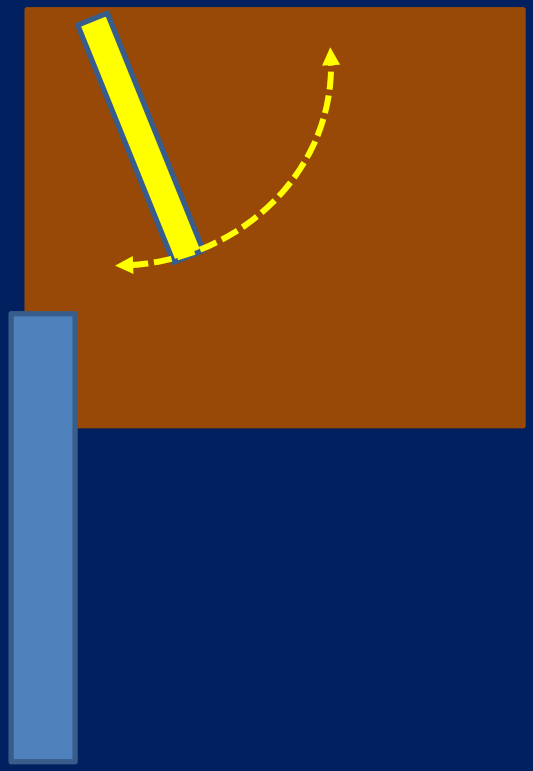


When making measurements, be sure to face directly into the wind.



Read the wind speed using the front edge of the indicator vane.

Caution: Protect Your Wind Speed Gauge



Your wind speed gauge may be fragile. Consider the geo-hazards in your area. Make a protective case for it. You need to be sure it will survive with you.

Community-based Environmental Education for

The End

www.neighborhoodlink.com/org/rtcth

E-mail: rtc2k5@gmail.com