Rural Training Center – Thailand (RTC-TH)

FOCUS

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

M.E.W.S.

Mobile Emergency Weather Station

The 8th Garec
MyGarec 2012
MALAYSIA

GAREC 2012
Edition V3

An Emergency Communications Program of the Rural Training Center-Thailand

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.

E-mail: hsØzhm@gmail.com

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

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.

MEWS adapts weather lessons from 2 existing RTC-TH programs

E-mail: hsØzhm@gmail.com

www.neighborhoodlink.com/rtc-th_Tech/pages

MEWS in the News

In Apr 2011 MEWS was presented to Radio Amateur Society of Thailand and the world as a Thai New Year gift to all hams.
Two ham internet sites saw fit to announce MEWS to the world.

http://forums.qrz.com/showthread.php?293778-Mobile-Emergency-Weather-Station-Complete-quot-How-to-build-and-use-quot

MEWS on Hamuniverse.com
http://www.hamuniverse.com/hs0zhmmewslessons.html
Sparky the RTC-TH MEWS unit
http://www.hamuniverse.com/hs0zhmsparky.html

The Need

Photos from the Internet; educational fair use clause

Disasters disrupt existing infrastructures. Damaged roads cut access, stopping and slowing relief to stricken areas.

The Need

Water, food, sanitation, energy, transportation, and communications are often in ruin or short supply after a disaster.

Photos from the Internet; educational fair use clause

Weather conditions can affect transportation, routing, and delivery of relief supplies.

Weather Data For Relief Operations

Photos from the Internet; educational fair use clause

Weather conditions affect survivors need for water, food, shelter, and medical aid as well as the locations of safe zones.

The Need

Sometimes there is not much left at all.

Photos from the Internet; educational fair use clause

The Need

Emergency relief workers often lack accurate on-site information especially from isolated areas

Photos from the Internet, educational fair use clause

Photo from the Internet; educational fair use clause

When disaster strikes, site specific weather data may not be available.

Helicopters are important in relief operations

Photos from the Internet; educational fair use clause

Helicopters bring in critical supplies and experts

Photos from the Internet; educational fair use clause

Helicopters evacuate the seriously injured

Photos from the Internet; educational fair use clause

Most helicopters operate only by Visual Flight Rules; Pilots must see the ground

Weather conditions affect emergency helicopter flight operations.

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

EmComm Emergency Communications
RTC-Thailand Rural Training Center-Thailand

Ask a pilot

"When flying to an unfamiliar disaster area, would you prefer some weather data or NO weather data from the disaster zone?"

MEWS enables hams to provide the weather data.

The pilot in command decides how to make use of it.

Hams don't control the flight.

MEWS can help avoid this

Flying into unfamiliar terrain without weather data increases the dangers for relief helicopter flight crews

Photos from the Internet; educational fair use clause

Amateur radio operators (hams) have always been ready to serve their communities in times of need

Photos from the Internet; educational fair use clause

Hams are equipped for EmComm (Emergency Communications)

Photo courtesy of E20NXT

They have a self-contained portable radio station: radio, antenna, power supply, and a trained operator.

Hams are equipped for EmComm

Photo courtesy of E20NXT

They can be prepared for extended deployment with their own tents and daily living supplies.

Photo courtesy of E20NXT

Amateur radio operators (hams) who are MEWS trained and equipped to make weather observations become more valuable community emergency response team members.

RTC-TH MEWS Operating Modes

Each operational mode has advantages / disadvantages and costs.

Pedestrian

Bicycle

Mobile

Portable

Basic and Advanced MEWS can be done in any mode. However, Advanced equipment suitable for pedestrian and bicycle modes can be expensive.

Operational Scenario

The soft spot in the MEWS operational scenario: hams operating on amateur frequencies may not be able to communicate directly with relief helicopter crews

MEWS field unit reports via VHF or HF

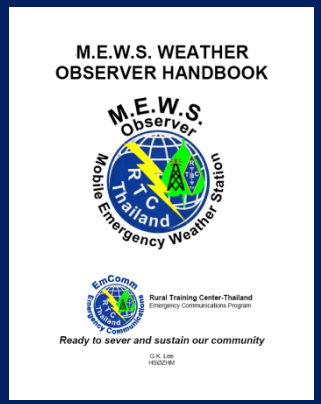
EOC relays weather data to relief authorities and aircraft

Relief Helicopter

Direct communications between MEWS hams and flight crews reduces time to get data especially to support emergency helicopter landing zone operations in the disaster area.

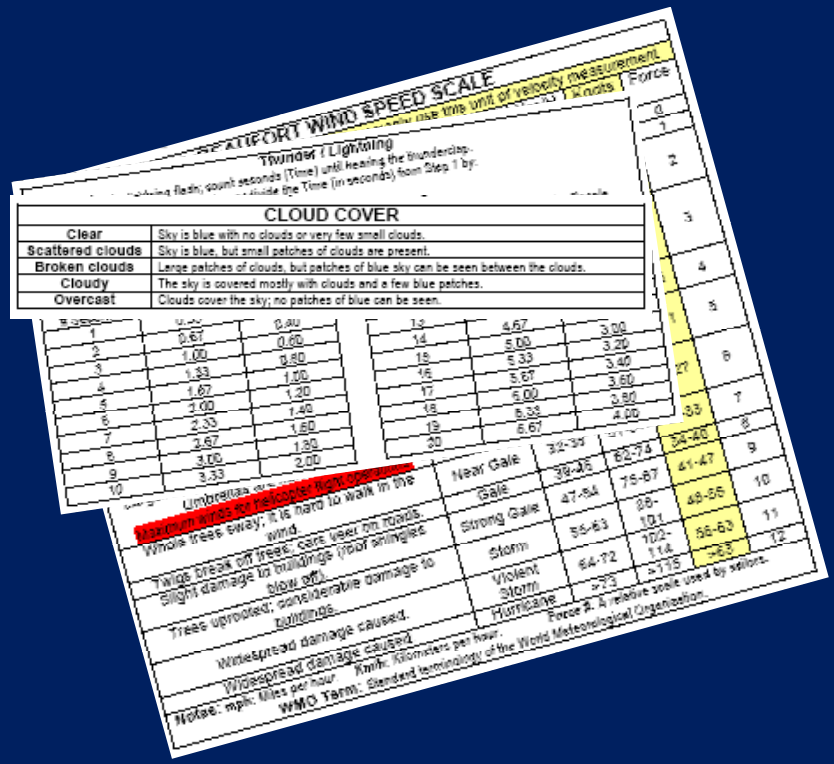
The MEWS enHAMcement

MEWS enhances a ham with basic weather observation training and equipment



The RTC-TH Approach

No Tech / Low Tech Weather Observations

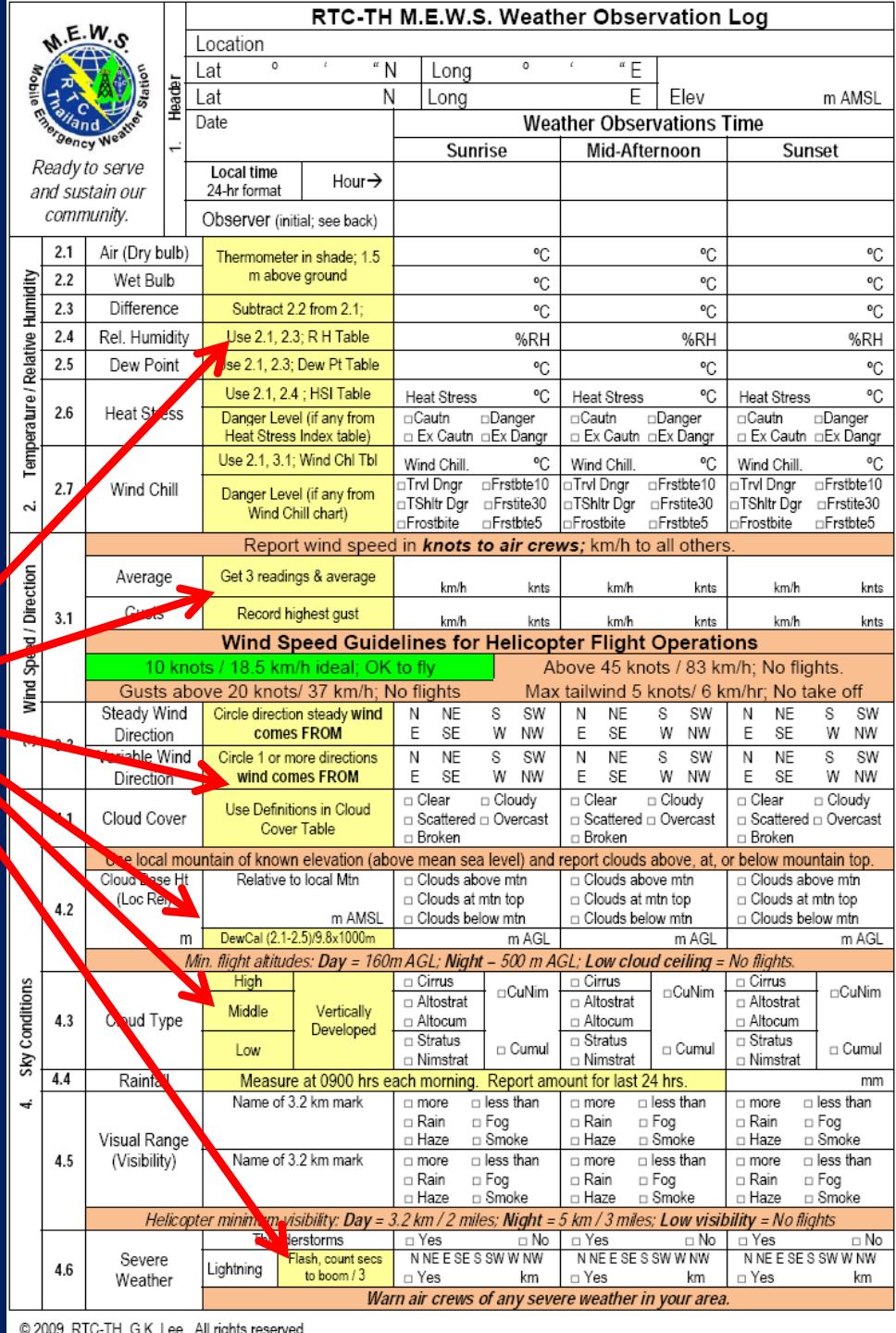


By keeping it simple, there is low cost, less equipment to break, malfunction, or run out of power, and less maintenance.

The MEWS Weather Observation Log

has highlighted notes to guide making observations with minimal training.

Detailed instructions are in the MEWS manual



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

			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 □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

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

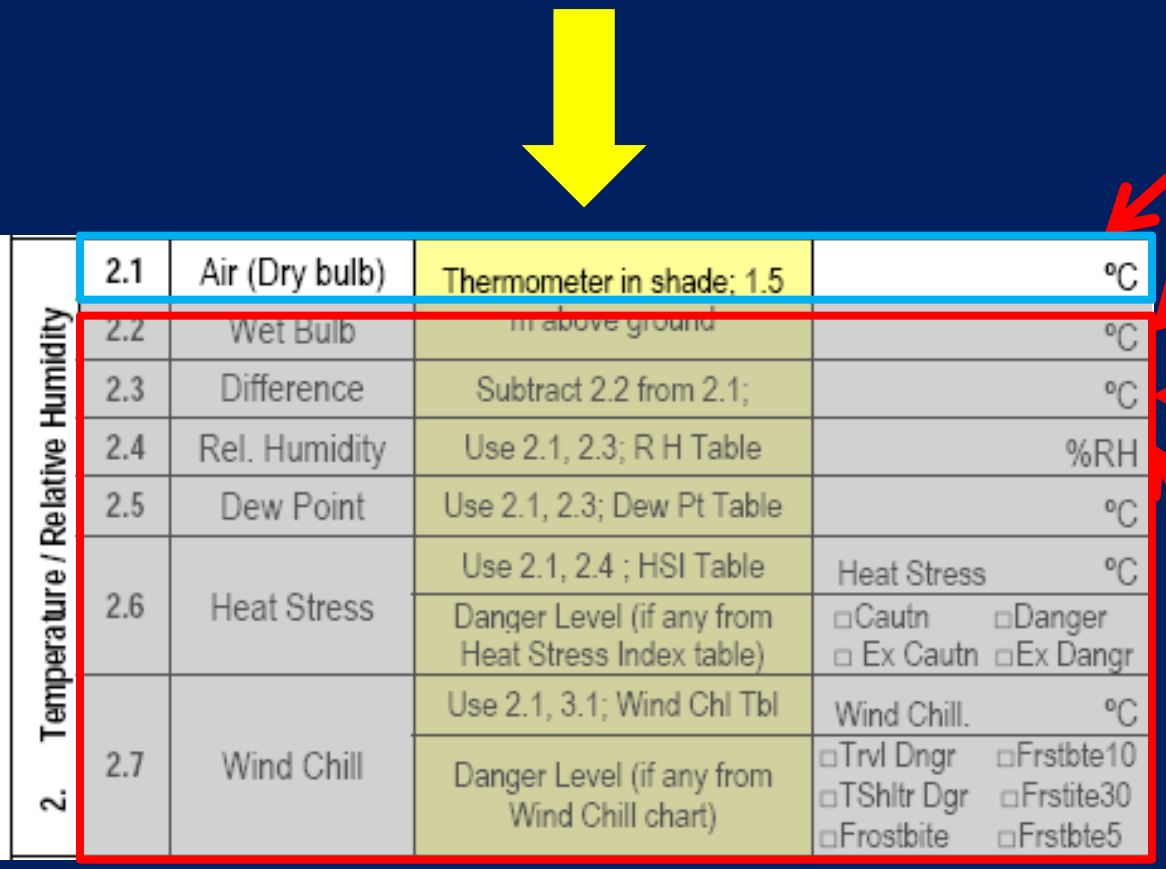
10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.
Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/hr; No take off

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
3.3	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 Ref)	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 / DewCal (2.1-2.5)/9.8x1000m	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.				

Instructional notes let you make MEWS observations with minimal training



2. Temperature / Relative Humidity				
2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground		°C
2.2	Wet Bulb			°C
2.3	Difference	Subtract 2.2 from 2.1;		°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table		%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table		°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress	°C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill.	°C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	

2.1 Get air temp

2.2 Get wet bulb temp

2.3 Subtract 2.2 from 2.1 and record

2.4 Look up % RH in table using 2.1 and 2.3; and record % RH

The MEWS Weather Observation Log

back of form has expanded notes for doing observations with minimal training.

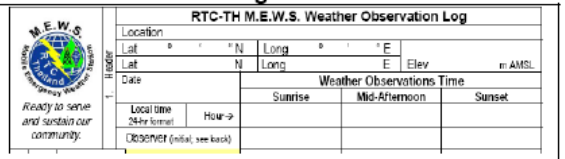
Detailed instructions are in the MEWS handbook

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

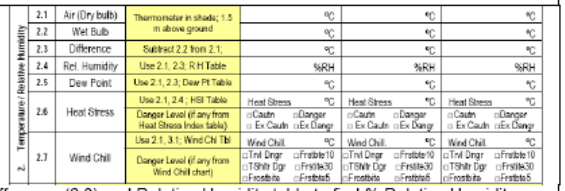
M.E.W.S. Summary Weather Observation Log Instructions

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

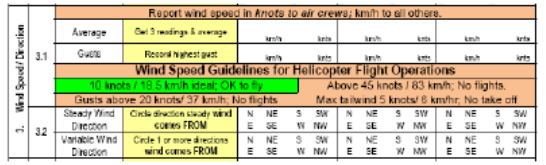


Temperature / Relative Humidity



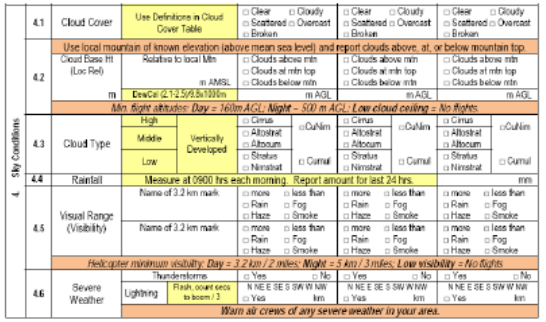
2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.
2.2 Wet Bulb Temp from hyrgrometer kept in the shade, 1.5 m above the ground.
2.3 Difference between Dry and Wet Bulb temperatures.
2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity 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

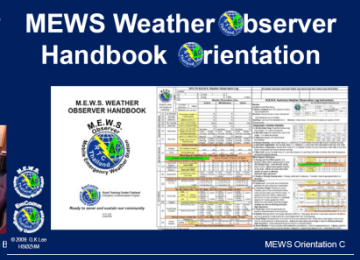


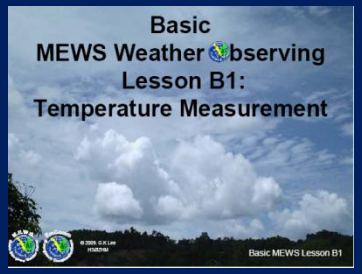
4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.
4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry 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.

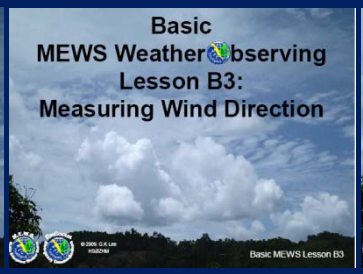
Basic MEWS PDF Lessons

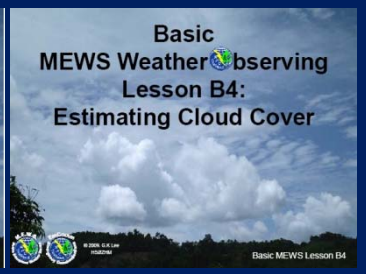
B 1: Measuring Temperature
B 2: Estimating Wind Speed
B 3: Measuring Wind Direction
B 4: Estimating Cloud Cover
B 5: Estimating Cloud Base Height
B 6: Identifying Cloud Types
B 7: Estimating Visual Range
B 8: Severe Weather Conditions

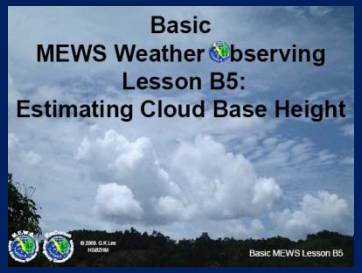
Basic MEWS PDF Lessons

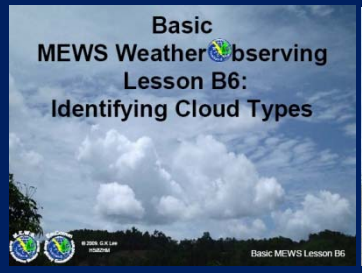


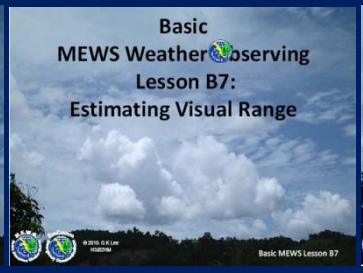












3 Orientation and 8 Basic lessons.
Some show how to build your own weather equipment.

Basic MEWS Weather Observer Tasks

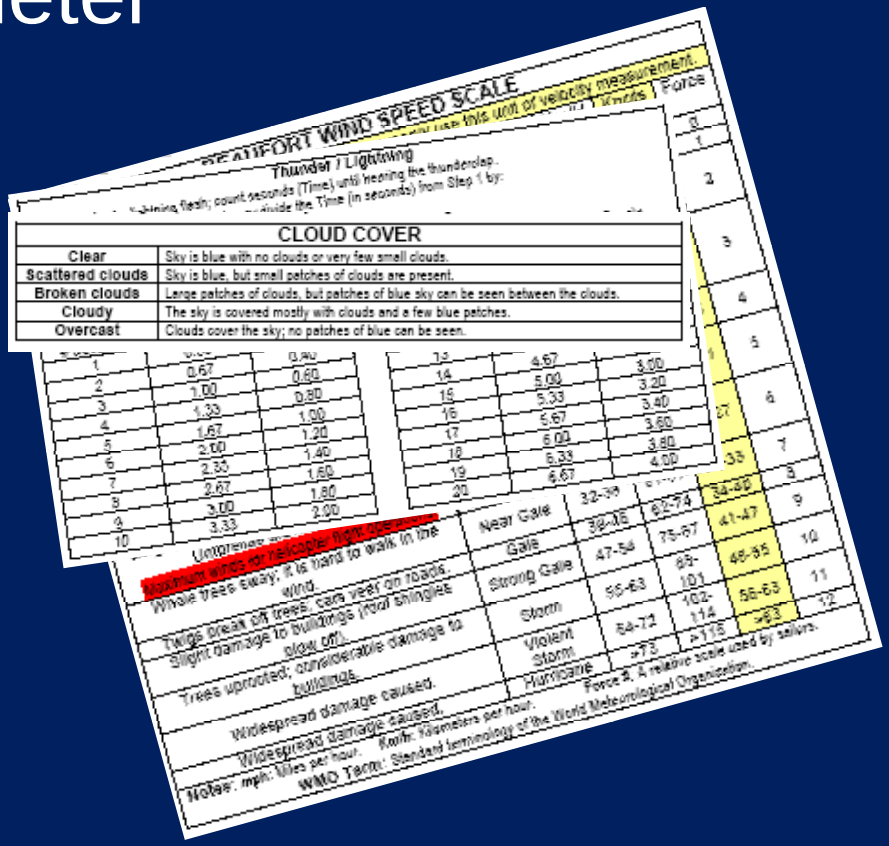
Basic weather observations are systematic relative / subjective estimates linked to standard reference cards.

- Temperature (measured)
- Estimate Wind Speed
- Wind direction
- Cloud cover
- Estimate cloud height
- Visibility
- Thunder / Lightning

- Useful for planning and setting priorities according to local environmental conditions
- Give general flight weather data at the landing zone

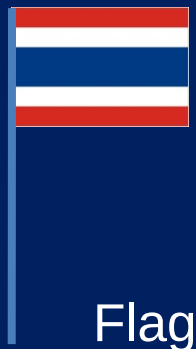
The Basic MEWS Weather Observer's kit

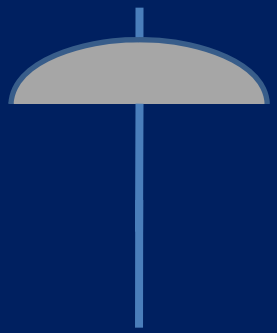
Thermometer



Basic Reference tables

Magnetic compass (optional)



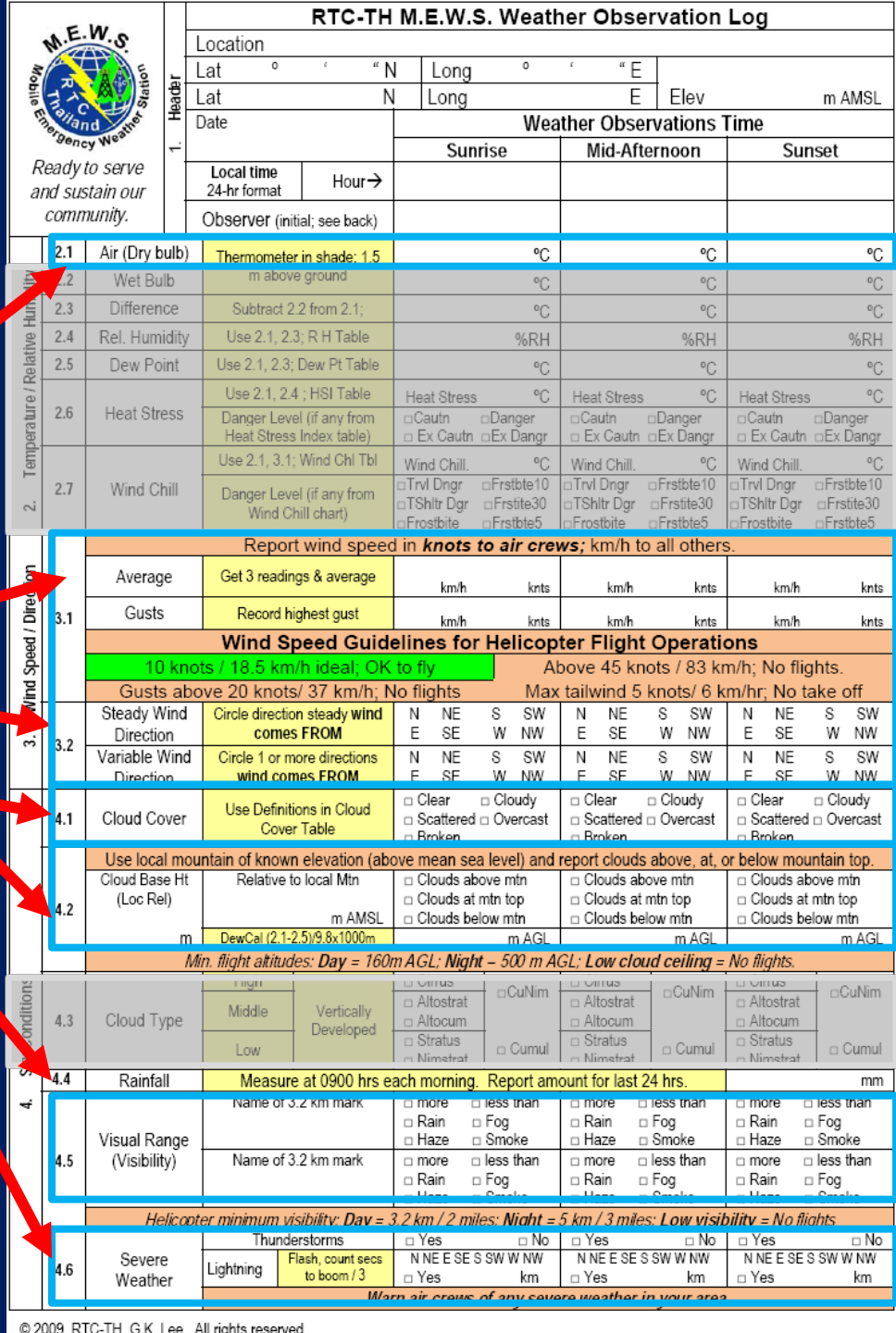


Flag & Umbrella (optional)

Basic MEWS Observations are recorded here on the Log Form

- 2.1 Temperature
- 3.1 Estimate Wind Speed
- 3.2 Wind direction
- 4.1 Cloud cover
- 4.2 Estimate cloud height
- 4.5 Visibility
- 4.6 Thunder / Lightning

Detailed instructions are in the MEWS handbook



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

			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
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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
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 □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

3. Wind Speed / Direction

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

			Sunrise	Mid-Afternoon	Sunset
3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
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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

			Sunrise	Mid-Afternoon	Sunset
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

			Sunrise	Mid-Afternoon	Sunset
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	m AMSL / DewCal (2.1-2.5)/9.8x1000m	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.*

					Sunrise	Mid-Afternoon	Sunset
4.3	Cloud Type	High	Vertically Developed	□Cirus □Altostrat □Altocum □Stratus □Nimstrat	□CuNim □Cumul	□Cirus □Altostrat □Altocum □Stratus □Nimstrat	□CuNim □Cumul	□Cirus □Altostrat □Altocum □Stratus □Nimstrat	□CuNim □Cumul
		Middle							
		Low							
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		□ more □ less than □ Rain □ Fog		□ more □ less than □ Rain □ Fog

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

				Sunrise	Mid-Afternoon	Sunset
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

The MEWS Weather Observation Log

Photo from the Internet; educational fair use clause

has highlighted items critical for helicopter flight operations.

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

M.E.W.S. Mobile Emergency Weather Station — RTC Thailand

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

Local time 24-hr format	Hour→	Sunrise	Mid-Afternoon	Sunset
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
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 □Frstbte10 □TShltr Dgr □Frstite30	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30

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

Wind Direction / Speed

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

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.

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 / DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

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

4. Sky Conditions

4.3	Cloud Type	High			□Cirus		□Cirus		□Cirus	
		Middle	Vertically Developed	□CuNim	□ Altostrat □ Altocum	□CuNim	□ Altostrat □ Altocum	□CuNim	□ Altostrat □ Altocum	□CuNim
		Low		□ Cumul	□ Stratus □ Nimstrat	□ Cumul	□ Stratus □ Nimstrat	□ Cumul	□ Stratus □ Nimstrat	□ 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			□ more □ less than □ Rain □ Fog		□ more □ less than □ Rain □ Fog	

*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.

Wind Advisory Notes for Helicopters

3. Wind Speed / Direction	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
		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

- Operating limits are on the form for ready reference
- Color coded for OK or warning
- Operator looks at form, reads off weather data and relevant flight crew warning.

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

Advanced MEWS PDF Lessons

6 slide show lessons
Some show how to build your own weather equipment

Advanced MEWS Weather Observer Tasks

All the Basic observations plus:

- Relative Humidity
- Dew Point
- Heat Stress Index
- Wind Chill Factor
- Measured wind speed
- Calculate cloud height
- Cloud type
- Rainfall

- More detailed local environmental conditions affecting survivors
- More accurate cloud ceiling which could affect flight operations
- Give measured flight weather data at the landing zone
- Gives basic weather forecasting capability

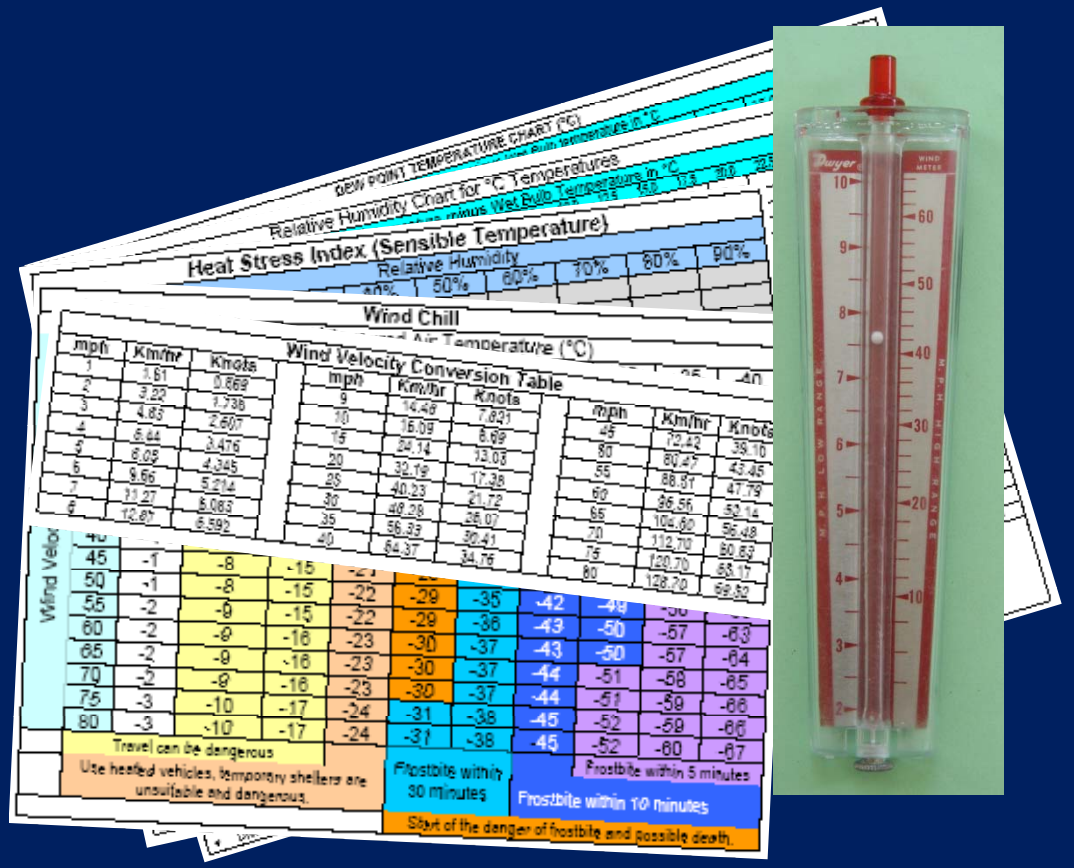
Advanced Weather Observer's kit

Rain Gauge

Hygrometer

Calculator

Dwyer wind gauge



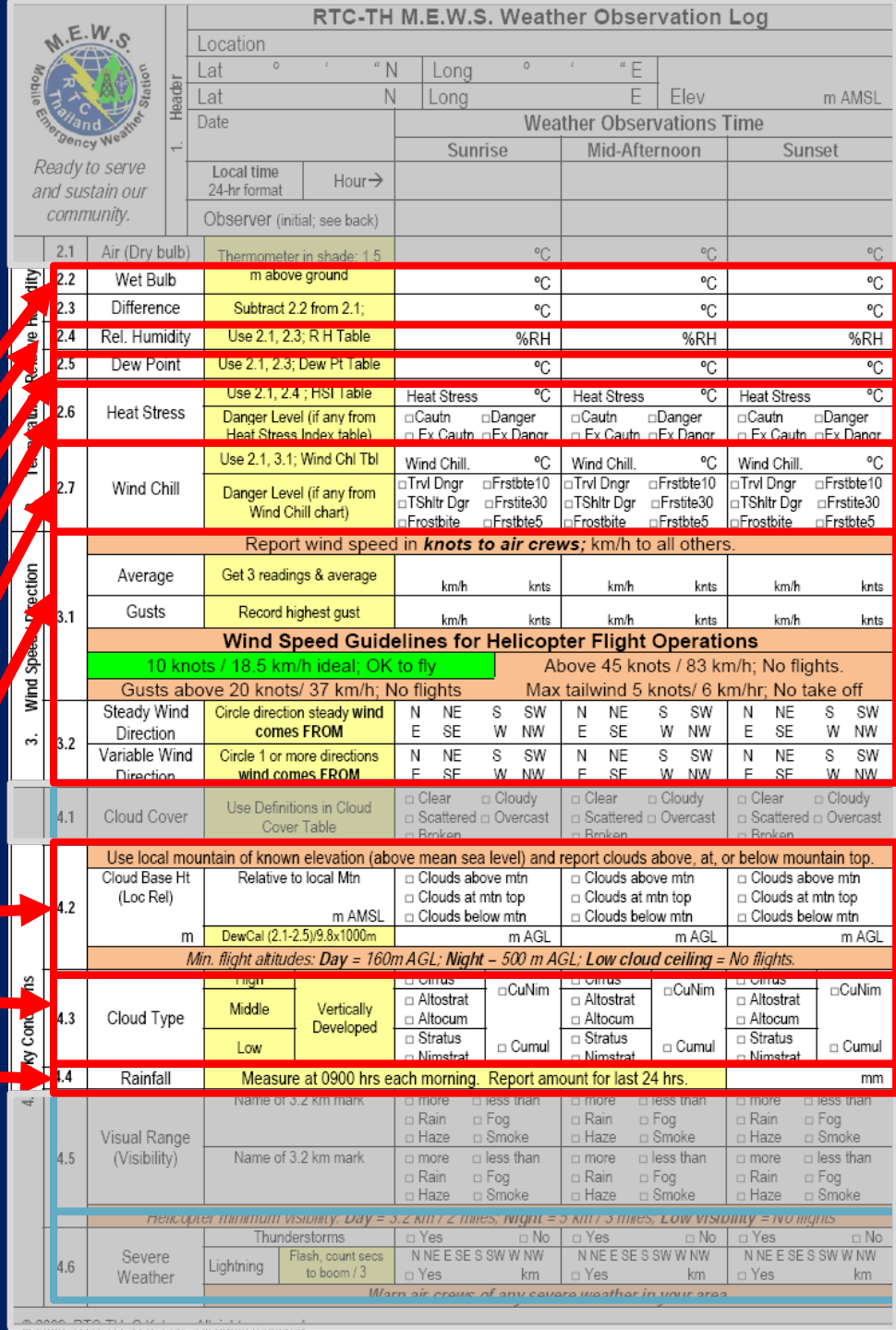
Advanced Reference tables

In addition to all Basic MEWS materials

Advanced MEWS Observations are recorded here on the Log Form

- 2.2 / 2.3 Temp calculations
- 2.4 Relative Humidity
- 2.5 Dew Point
- 2.6 Heat Stress Index
- 2.7 Wind Chill Factor
- 3.1 Measured wind speed
- 4.2 Calculate cloud height
- 4.3 Cloud type
- 4.4 Rainfall

Detailed instructions are in the MEWS handbook



Other Advanced Equipment

Digital Thermometer

Digital Hygrometer

Analog Weather Station

Sling Psychrometer

Digital Weather Station

Photos from the Internet; educational fair use clause

Some HAMs may already have some of these

More Advanced Equipment

Kestrel Pocket Weather Station

SkyScan Lightning Detector

Strike Alert Lightning Detector

GPS

Photos from the Internet; educational fair use clause

Some HAMs may already have some of these

Even More Advanced Equipment

Portable Weather Station

Photo from the Internet; educational fair use clause

APRS Weather Station

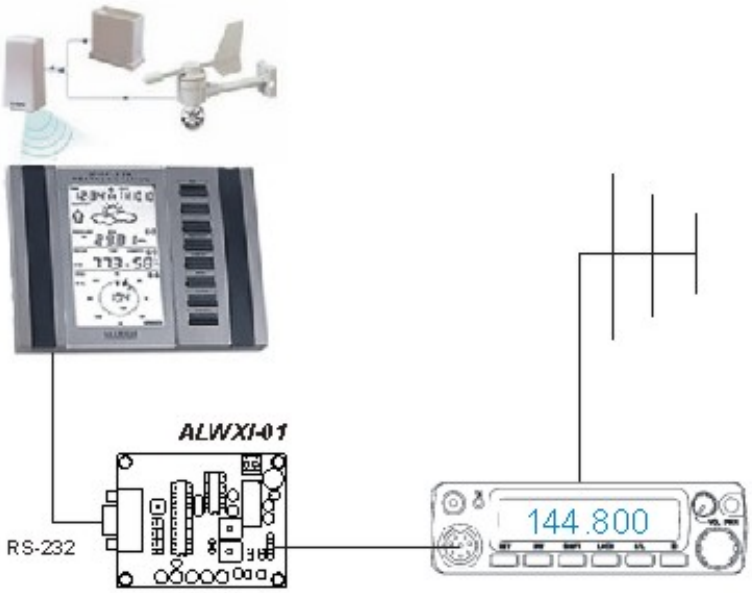


Photo from the Internet; educational use clause

This type of automated digital equipment could be added to MEWS if funds were available

What Can You Do?

If you are **not a HAM**

- Get involved
- Join a radio club
- Join a radio society
- Get a license
- Get a radio

If you **are a HAM**

- Join a radio club
- Join a radio society
- Learn EmComm
- Learn MEWS
- Make an emergency plan
- Join or form an EmComm Team

You can learn MEWS free by mentor or self-study

Photo courtesy of N7YLA

Mentoring

can be done face-to-face (individually or in small groups on-site at cost) or free over the Internet

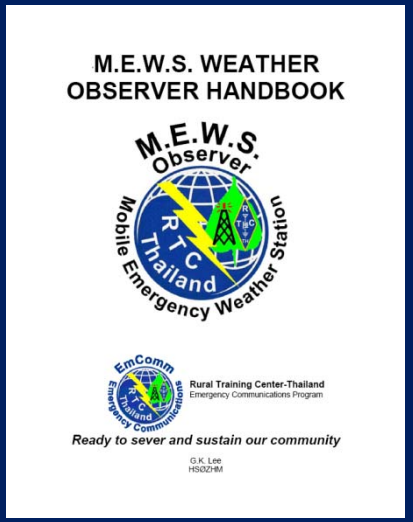
Via E-mail
hs0zhm@gmail.com

Via Skype video conference call: rtc_th

Free Self-Study Materials by Internet

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

All of the lessons have been classroom and field proven.

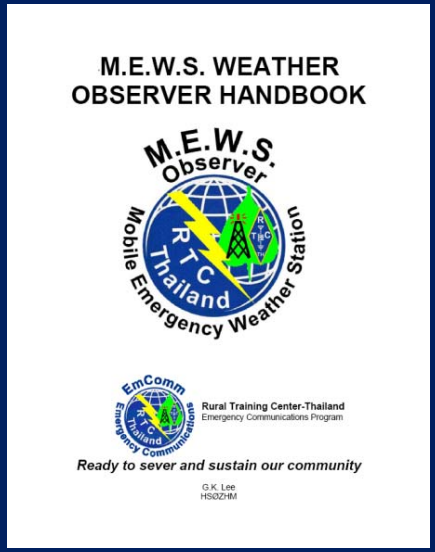


Send e-mail to hsØzhm@gmail.com to request free training materials for non-commercial use only.

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

Questions or Comments

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



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.

MEWS Empowers

Many survivors feel and act as helpless disaster victims

Even children can quickly learn MEWS and help EmComm hams actively support the relief effort.

MEWS Before / After Disaster Strikes

Learning MEWS before a disaster is a practical way for students to use their classroom lessons in the real world to help their family farms.

MEWS procedures follow standard weather observation methods. People who learn MEWS get practical job skills.

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

Contact
Greg HSØZHM
MEWS Creator / Mentor

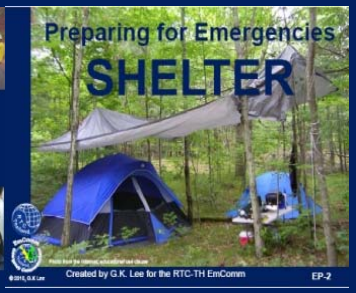
Via E-mail
hsØzhm@gmail.com

Via Skype video conference call: rtc_th

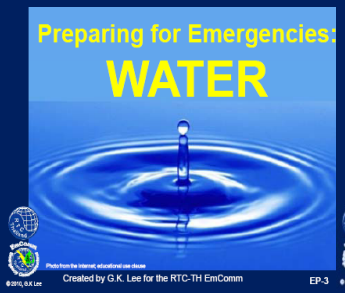
The Emergency Preparedness Lesson Series

These lessons were created for Nan Province, Thailand but hams can readily adapt them to their locations

EP-1



EP-2



EP-3

EP-4

EP-5

EP-6

EP-7

EP-8

EP-9

EP-10

EP-11

EP-12

Em Prep
Hope for the best: Prepare for the worst
RTC-Thailand
Rural Training Center-Thailand
Emergency Preparedness

EmComm
RTC-Thailand
Rural Training Center-Thailand
Emergency Communications

www.neighborhoodlink.com/RTC-TH_Tech/pages

I EmComm, therefore I am.

I didn't, therefore I am not

Community-based Environmental Education for

The End

Rural Training Center-Thailand
rtc2k5@gmail.com
www.neighborhoodlink.com/rtc-th_Tech/Pages