



Learning Goals

Basic information for the TOWER controller

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TOWER (TWR)

Responsibility

- All tasks as DEL and GND when positions are not online
- ATIS setup
- Control departing and arriving traffic IFR
- Backtracking runways
- Crossing runways
- Labelling IFR
- Control departing and arriving traffic VFR
- Controlling VFR in the circuit with traffic info
- Labelling VFR
- Emergency handling

Make sure that you are totally familiar with all airport procedures and have all charts available for ground movement, holding points, runway intersections, IFR and VFR-traffic.

ATIS setup

The tower is responsible for the setup of the ATIS. Aircrafts need to depart with an upwind as much as possible. so check the METAR first before you setup the ATIS. Open the runway nr which is closest to the wind direction mentioned in the METAR.

At Cairo the preferred runways are 05L, 05C and 05R. So even when the winds are from the opposite direction but 5 knots or less (winds calm), the preferred runways will be opened.

for instance:

winds 250 @ 3 open runways 05L/05C for departure and 05C/05R for arrival

winds 250 @ 8 open runways 23C/23R for departure and 23L/23C for arrival

Do not change runways constantly at variable winds. Check the METAR and the TAF. the winds must be higher than 5 knots for at least 5 minutes and remain stable higher than 5 knots before the ATC will change runways.

Check the local procedures for runway preference when the airport has more than 1 runway!

To maintain safety and reduce waiting time for the pilots the following order of priority is needed:

Priority:

1. Emergency handling
2. Arriving traffic
3. Departing traffic
4. Taxiing traffic
5. Start-up and or delivery clearance



Departing and arriving traffic: IFR

When the aircraft has reached the holding point Ground will send him to you for his line up and take off clearance.

Line up clearance:

Communicate with Ground when you want him to handover an aircraft. To maintain a good flow its better for the pilot that he can take off immediately rather than having to stop at the holding point...report to ground he reached it....switch frequency....tell again to tower etc..... that's a waste of time.

Also when there is no aircraft departing in front or on arrival....it's totally useless to give a pilot the instruction to line up and wait.

WRONG: "MSR961", line up and wait runway 05C.

In case there are more aircrafts waiting for the take-off clearance at the holding point. Line them up in sequence. when the departing aircraft is taking off...the next one can line up in position.

CORRECT: "MSR961", line up in sequence

or

CORRECT: "MSR961", **behind** departing B737 line up runway 08L **behind**.

Note that the word BEHIND is said TWICE!

Take off clearance:

For all sorts of safety reasons it's the task of the tower to maintain separation between departing aircrafts. The following rules will apply :

L=Light M=Medium H=Heavy

L after H	2 min separation
M after H	2 min separation
L after M	2 min separation
L after L	2 min separation

all other cases 1 min separation.....but....with a few exceptions which are:

same route (same first waypoint)	2 minutes
divergent route (different first waypoint)	1 minute
intersection departure	add 1 minute

when launching aircrafts in less than the prescribed separation times, you must add the words: caution wake turbulence in your clearance:

CORRECT: "MSR961", Caution, wake turbulence, winds calm, runway 08L, cleared for takeoff, after passing 2000ft, approach 119.05

Be very careful with launching aircrafts in less than the prescribed separation times:

When two aircrafts flying the same SID, it is only allowed when you give the second aircraft a runway heading! Approach will later on put the aircraft back on the SID. So communicate this in advance with the approach controller!



When two aircrafts flying different SID's, it is only allowed when the first aircraft has passed the 2000ft or when he already has turn 45 degrees to left or right from runway heading.

Now with these separation times in mind...it's time to give the clearance for take-off when the pilot has reported that he is fully ready for departure. Let's review first when it's all clear to go and we have no arriving traffic for the same runway.

When the pilot is going to follow a standard departure route:

WRONG: "MSR961", winds 076 at 3 knots, cleared for departure runway 08L.

first of all...when winds are less than 5 knots you don't need to inform the pilot about the wind situation. Just say : winds calm!

When wind information is needed to report: round it up to the dozen...so winds 080 instead of 076.

CORRECT: "MSR961", winds calm, runway 05C, cleared for takeoff, after passing 2000ft, approach 119.05

Never ever say cleared for departure....an aircraft is cleared for takeoff !

When the pilot was instructed in his clearance to maintain runway heading. It's good to remind him again during take-off clearance

CORRECT: "MSR961", winds 120 at 8 knots, runway 08L , cleared for take-off, runway heading, after passing 2000 feet, approach 119.05.

In case an aircraft is ready for departure but we also have arriving traffic for the same runway we need to review the situation carefully.

When there is enough distance between departing and arriving traffic (at least 7 nm between heavies and mediums) you ask the pilot of the departing aircraft if he is ready for immediate take off...

CORRECT: "MSR961", are you ready for immediate take-off?

Pilot: Affirm....

The pilot has confirmed that he is ready for immediate take off so you can clear him.

DONT use terms like " rolling take-off" or " rolling departure" this is not proper phraseology but commonly heard on IVAO

CORRECT: "MSR961", winds 060 at 8 knots, rwy 05C, cleared for immediate takeoff, after passing 2000ft , approach 119.05.

If the distance between the arriving aircraft and departing aircraft is not safe enough for immediate departure...tell the departing aircraft:

CORRECT: "MSR961" hold short, traffic on final.



*One golden rule after given the pilot the take-off clearance:
DONT talk to him anymore before he has reached a reasonable height (at least 800ft) . Talk to him only in case of an emergency. It's a stressful moment for the pilots during take-off.*

When 2 parallel departure runways are in use DO NOT give them both the take off clearance but launch them off, one by one...and wait until the first aircraft is airborne!

One final note:

At some airports (e.g. EHAM) it's not even customary to include the winds in the takeoff clearance when winds are less than 20 knots! So....once again...check the local procedures!

Landing clearance:

For all sorts of safety reasons it's the task of the **APPROACH** to maintain separation between arriving aircrafts. The following rules will apply :

L=Light M=Medium H=Heavy

H after H	4 nm	2 min separation
M after H	5 nm or	3 min separation
L after M	5 nm or	3 min separation
L after H	6 nm or	3 min separation

When all is safe, you clear the arriving aircraft for landing.
Mention the winds and the runway

CORRECT: "MSR961", winds 070 at 8 knots, runway 05C, cleared to land.

When 2 or more aircrafts are on the approach for the same runway, Approach will keep good separation between the aircrafts. After being handed over it is your responsibility now to maintain the separation and provide good traffic info. Warn the pilots if they may expect wake turbulence !

CORRECT: "MSR961", winds 070 at 8 knots, caution wake turbulence, runway 05C, cleared to land.

You rather have 2 aircrafts landing safely rather than one has to go around. A go around costs MONEY !

CORRECT: "MSR961", surface winds 120 at 8, continue approach, number 2,

or even better traffic info:

CORRECT: "MSR961", surface winds 120 at 8, continue approach, traffic 5nm ahead, B737 2nm from touchdown, expect late landing clearance.

note: provide wind information to the pilot even if he is still not cleared to land!

ONLY if the first aircraft has landed and vacated the runway you give the landing clearance to the second aircraft on final.



If the aircraft on the runway has NOT vacated yet... then the second aircraft will go around when he has reached his minimums. A good pilot will automatically do that because he has not yet received his clearance to land.
In case he fails to do that, you should ORDER him to go around!

CORRECT: "MSR961", go around. Climb 3000ft on runway heading and contact approach 119.05

In the above instruction you tell the pilot what to do and the approach controller will take over.

CORRECT: "MSR961", go around, execute missed approach as published.

In the instruction above you instruct the pilot to read his charts and follow the procedure for the missed approach.

Check the METAR for wind shear! These winds are very dangerous during the approach and a pilot must be warned again in advance before attempting to land.

CORRECT: "MSR961", winds 070 at 8 knots, runway 08L cleared to land, caution wind shear at 800 feet.

Some airports in the world have highly sophisticated Doppler radar systems which can detect and Alert ATC and pilots for wind shear.

In case the airport is not equipped with these systems, the pilot suffering from wind shear will report immediately to ATC so he can warn the next arriving traffic.
Persistent wind shear will eventually be put in the METAR .

**EHAM 261155Z 21017KT 4500 R18L / 2000VP2500D -RA DZ BR FEW005 BKN007
BKN009 M12 / 12 Q1013 RETS -RA DZ BR WS RWY06 TEMPO FM_1400
TL_1530 1000SE 5000N R18L / 2000VP2500D SN OVC010 ARR_RWY_18R /
DEP_RWY_18L / TRL_FL040 / TA_3000FT**

Backtracking runways

backtracking before departure:

CORRECT: "MSR961", backtrack runway 04, report ready for departure.

backtracking upon arrival:

When a backtrack of a runway is needed you can include it in your clearance to land.

CORRECT: "MSR961", winds 230 at 10 knots, runway 22, cleared to land, backtrack and vacate via W.

Labelling

At airports where there is a fixed initial climb (like EHAM) the TWR controller will label the initial climb just before take-off

Other airports (like HECA) the labelling of the initial climb has already been done by Delivery if approved by Tower.



Crossing runways

as discussed in the chapter : Ground.....taxi clearance

Departing and arriving traffic: VFR

Departing VFR traffic

As discussed earlier, VFR traffic will receive the split clearance. First the start-up...and later the enroute.

Start-up is given by DEL or GND and normally a pilot should know his departure route.

nevertheless: tower will give VFR traffic again the clearance during the line-up or takeoff clearance.

CORRECT: "MSR961", winds 170 at 12 knots, downwind departure, 1000 feet, rwy 05L cleared for takeoff.

Arriving VFR traffic

Arriving VFR traffic is in contact with TOWER ONLY and they MUST report at least 10 minutes before entering the CTR (control zone).

the tower then informs the VFR traffic with :

- Arrival
- Runway
- QNH
- Squawk
- Traffic info if needed.

for instance:

CORRECT: "MSR961", Mike arrival, runway 04, QNH 1016, SQWK 7011

Normally when VFR traffic is flying an arrival route, the route is marked with reporting points. The pilot will inform Tower when he reached that point and Tower will reply with "roger"

If the airport doesn't have a specific arrival for VFR tell him to enter the AERODROME TRAFFIC pattern.

for instance:

CORRECT: "MSR961", join left hand downwind , runway 05L, QNH 1016, SQWK 1115.

Now the pilot knows which runway is open for landing...05L....that the normal traffic pattern for rwy 05L is a left hand circuit and that he is no longer in uncontrolled airspace. Hence the change of squawk 7000 (uncontrolled airspace VFR) to 7011. A good pilot will report when he is on the downwind.



VFR traffic flying a local pattern

As discussed earlier, VFR traffic will receive the split clearance. First the start-up...and later the en-route.

Start-up is given by DEL or GND and normally a pilot should know his departure route.

nevertheless: tower will give VFR traffic again the clearance during the line-up or takeoff clearance.

CORRECT: "MSR961", winds 070 at 12 knots, left hand circuit, 1000 feet, rwy 05L cleared for takeoff.

These patterns consist of distinctive phases:

- Upwind
- Crosswind
- Downwind
- Base leg
- Final

Pilots will have to report on the downwind leg with their intention and when they are on final like:

Pilot: " MSR961" downwind for full stop landing

CORRECT: "MSR961", you are nr 1 in the circuit , report final.

Pilot: " MSR961" field in sight, on final

CORRECT: "MSR961", winds calm, rwy 05L cleared to land.

reporting points on downwind and on final are standard...UNLESS...ATC instructs otherwise.

let's see what happens

Pilot: " MSR961" downwind for full stop landing, threshold base leg

CORRECT: "MSR961", full stop landing, threshold base leg approved , report BASE

Pilot: " MSR961" on base leg.

CORRECT: "MSR961", winds calm, rwy 05L cleared to land

Now ...what is happening here. The pilot requests to do a threshold base leg. This means that the final leg is shortened so if you wish you can already clear him to land on the base leg.

When skies are busy and VFR traffic on the downwind and you also have arriving traffic for the same runway: instruct the pilot to continue his downwind leg to create separation...or let him orbit 360 to the right (on left hand circuit) or 360 to the left (on right hand circuit)

CORRECT: "MSR961", extend downwind.MD11 on short final rwy 05L

CORRECT: "MSR961", orbit 360 to the right.

after all is safe....you instruct the VFR traffic to commence his turn to base leg.

Keep a very close look at VFR traffic. when more than one aircraft is in the pattern. Instruct them to maintain visual separation at least 3 nm !!! and provide traffic info ! I can't say this just enough. it's all about info info info and info



CORRECT: "MSR961", nr 2 in the circuit, maintain visual separation, Cessna172 at your 12 o'clock position

TIP:

In airports like Cairo when 05L and 05R are open for departure and landing.....use 05L for VFR local patterns (left hand circuit) not to get into conflict with IFR traffic and prohibited area's

In case there is an emergency on 05L while VFR traffic is still in the air, Re-Clear the traffic to join the base leg of runway 05C and make them land on 05C.
Stop all VFR traffic patterns !

Special procedures

Yankee flight arrivals (IFR switching VFR) will normally be handled by Approach for visual approach or VOR DME approach. Once established on the Localizer the traffic will be switched to you for the final clearance.

In the following cases the approach will switch the traffic to you

1. The approach cleared the switching VFR traffic in your CTR to join the aerodrome pattern.
2. a pilot requests or needs to perform a circle to land procedure.

Zulu flight arrivals (VFR switching IFR) will be handled as normal IFR

Emergency Handling

There are many kinds of problems a pilot can encounter.
for instance:

- Engine failure
- Electrical problems
- Mechanical problems
- Fuel shortage

When you as controller are faced with such a problem what do you need to do?

- assess the situation with the pilot as quick as possible.
- Prioritize the emergency handling.
- Stay in contact with the pilot and provide the assistance he requires. Does he need vectors? does he prefer another runway? does he need fire department or emergency service to be standby near the arriving runway?
- Control the situation in coordination with approach, ground and delivery. You probably have to close a runway in order to clear the way for the aircraft in distress.
- Use the Guard frequency to inform all pilots
- Instruct the emergency pilot to set squawk 7700 if he hasn't already done this.

Engine failure:

An aircraft with 4 engines will encounter in general less problems than an aircraft with 3 or less engines. Imagine what happens when a B737 has an engine 2 failure (right engine). The engine on the left will push the aircraft to the right and the pilot needs to compensate for that. If a turn has to be made, the pilot would prefer right turns !



Electrical problems:

Malfunction in electrical systems may cause a drop out of instrument readings. Ask the pilot if his main instruments are still functional. If not? Approach or tower can provide this information to the pilot like: "Turn right now", "Stop turn now", "Descend now", "Stop Descend now", " You are at 2200ft, descend now for 2000ft", " You are at 2000ft now", "Your speed is 200 knots", "5 nm from touchdown report runway in sight" etc...etc....

Mechanical problems:

A gear could be jammed. In this case let the pilot do a tower "Fly-by". inform the pilot for instance: " Right and Left gears appears down and nose gear appears up". If a "belly" landing has to be performed be mobilize the fire department and emergency service...the runway will be inactive probably for many hours to come.

Fuel shortage:

When the pilot declares a fuel shortage, he must be vectored to the nearest runway (in consultation with the pilot). Leave the descend up to the pilot. " When ready descend on your convenience. You are 20nm out of the ILS. Interception is on 2000ft"

General tips:

- Delivery, Ground and Tower are NOT radar positions and therefore should never use the term "RADAR CONTACT" or "IDENTIFIED" in their phraseology.
- Whatever position you occupy, always coordinate with other controllers for runways, sid's and initial flight levels.
- If clearance has been given, even during taxi, the ATC can always change that clearance if the Approach controller asks for it.
- use the term READ BACK CORRECT only after enroute clearance has been given and not every time a pilot reads back an instruction (like taxi...pushback etc.)
- English is mandatory when controlling....but it's ok to use your native language ONLY when there are no other pilots from other countries in your channel!
- Do not allow VFR flights at 2 runways
- Reject VFR circuit clearance when there are already 3 in the circuit
- Do not ask a pilot to recycle his squawk when he is on final approach
- Always give priority to an emergency situation and change the ATIS when you need to block a runway
- Maintain communication with adjacent controllers

Now....we know this is a lot of information and it is impossible to describe each and every situation.....but :

PRACTISE MAKES PERFECT....so ...good luck

want to read the more? read the document : Air Traffic Management 4444

