

MASS & BALANCE

BEM MEASUREMENTS

FREQUENCY OF MEASUREMENT

- **Individual Masses** used – 4 Years
 - **Fleet Masses** used – 9 Years

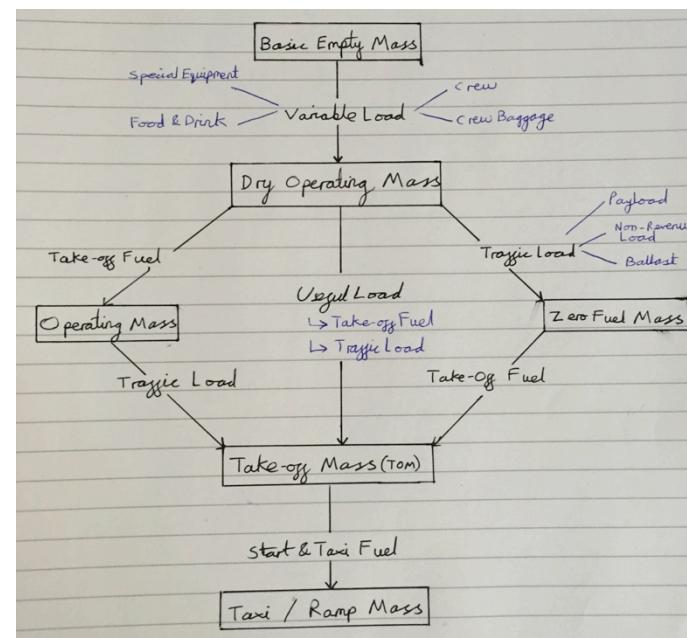
FLEET MASSES SAMPLE SIZE

$$\frac{2}{3} = n$$

$$4 \rightarrow 9 = \frac{n+3}{2}$$

$$10+ = \frac{n+51}{10}$$

- The aircraft chosen must be those with the longest time since last being weighed.
 - A fleet mass must be determined at least every **48 months**.



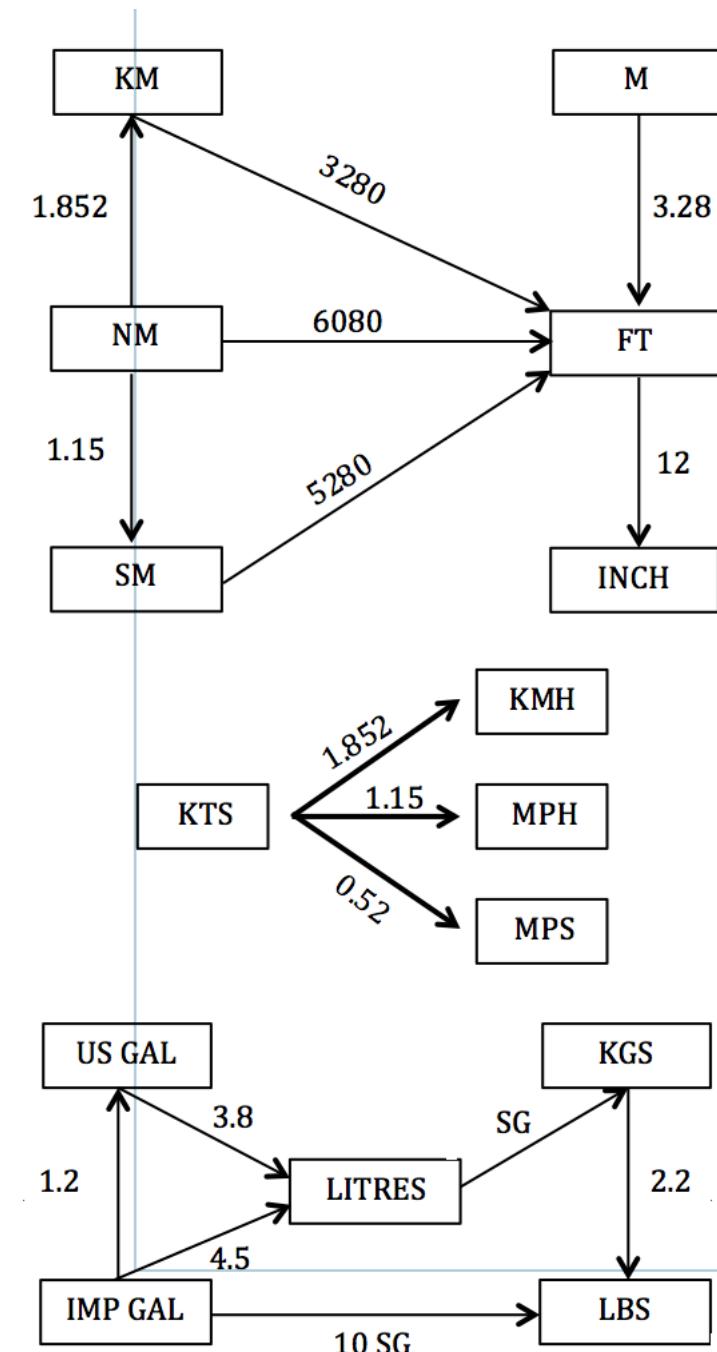
MAC

$$\% MAC = \frac{CG - LEMAC}{MAC}$$

CALCULATING MAX TAKEOFF MASS

- The max takeoff mass is the lowest of the following:

| RTOM | | RLM | | MZFM |
|-------|-------|-------------|------|----------------|
| MSTOM | PLTOM | MSLM | PLLM | - |
| N/A | | + Trip Fuel | | + Takeoff Fuel |



MASS & BALANCE

FLOOR LOADING

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$$\text{Floor Loading} = \frac{\text{Mass}}{\text{Area}}$$

RUNNING LOAD

$$\text{Running Load} = \frac{\text{Mass}}{\text{Length (Longest Side)}}$$

LOAD SHIFTING / REMOVAL

LOAD TRANSFER

$$\frac{d}{D} = \frac{m}{M}$$

M = Total Mass

m = Mass Moved

D = Distance between compartments

d = Δ CG

LOAD ADDITION / REMOVAL

$$\frac{d}{D} = \frac{m}{M}$$

M = New Mass (Or old mass if new not known)

m = Mass Added / Removed

D = Distance from compartment to new CG

d = Δ CG

LOAD CHANGES

New Moment = Old Mom. + Additional Mom.

MASS & BALANCE

PASSENGER MASSES

19 SEATS OR LESS

| Passenger seats | 1 - 5 | 6 - 9 | 10 - 19 |
|-----------------|--------|-------|---------|
| Male | 104 kg | 96 kg | 92 kg |
| Female | 86 kg | 78 kg | 74 kg |
| Children | 35 kg | 35 kg | 35 kg |

- If **hand baggage is accounted for separately or not carried**, 6 kg can be deducted from male and females masses.
- Infant on adults lap does not need to be accounted for. When seated on their own seat however, they should be assumed to be a child.
- **When less than 10 seats, pax masses can be determined by:**
 - Verbal statement
 - Actual masses
 - Pre-determined masses
- **Checked baggage** must be determined by actual weighing.

20 SEATS OR MORE

| Passenger seats | 20 and more | | 30 and more |
|-------------------------------------|-------------|--------|-------------|
| | Male | Female | All adult |
| All flights except holiday charters | 88 kg | 70 kg | 84 kg |
| Holiday charters* | 83 kg | 69 kg | 76 kg |
| Children | 35 kg | 35 kg | 35 kg |

- Masses include hang baggage
 - No provision for reducing
- Infant on adults lap does not need to be accounted for. When seated on their own seat however, they should be assumed to be a child.
- **Checked baggage** as per below:

| Type of flight | Baggage standard mass |
|----------------------------|-----------------------|
| Domestic | 11 kg |
| Within the European region | 13 kg |
| Intercontinental | 15 kg |
| All other | 13 kg |

CREW MASSES

STANDARD MASSES (INC CREW BAGS)

- Flight Crew: 85 kgs
- Cabin Crew: 75 Kgs