

# MASS & BALANCE

## BEM MEASUREMENTS

## FREQUENCY OF MEASUREMENT

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

## FLEET MASSES SAMPLE SIZE

$$2/3 = n$$

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

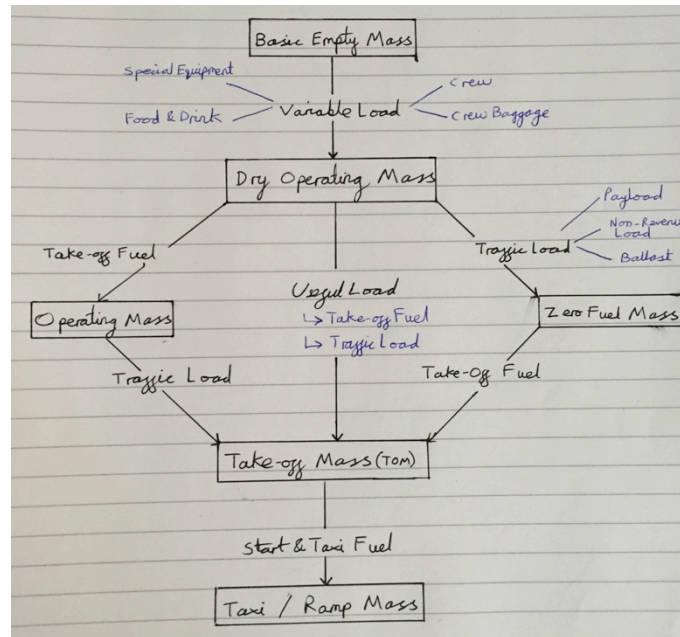
$$10 + = \frac{n+51}{10}$$

- 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**.

## CALCULATING MAX TAKEOFF MASS

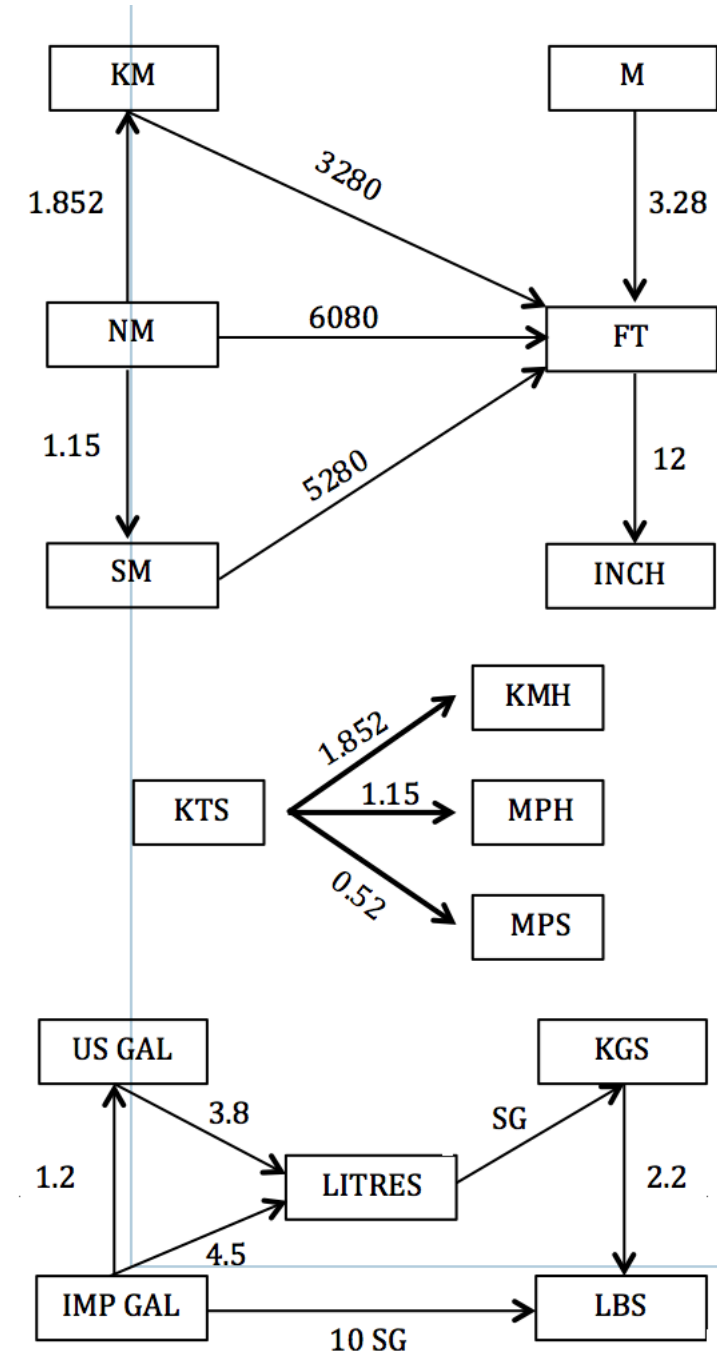
- The max takeoff mass is the lowest of the following:

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



## MAC

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



## 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 =  $\Delta$  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 =  $\Delta$  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