

[Home](#) > Write the procedure for balancing of a single rotating mass by single masses rotating in the same plane.

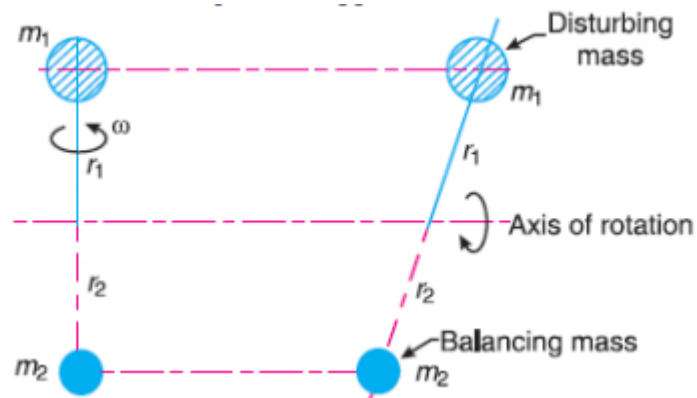
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Question:

Write the procedure for balancing of a single rotating mass by single masses rotating in the same plane.

Answer:

Procedure :Balancing of a Single Rotating Mass By a Single Mass Rotating in the Same Plane Consider a disturbing mass m_1 attached to a shaft rotating at ω rad/s as shown in Fig. Let r_1 be the radius of rotation of the mass m_1 (i.e. distance between the axis of rotation of the shaft and the centre of gravity of the mass m_1). We know that the centrifugal force exerted by the mass m_1 on the shaft, $F_{Cl} = m_1 \cdot \omega^2 \cdot r_1$. . . (i) This centrifugal force acts radially outwards and thus produces bending moment on the shaft. In order to counteract the effect of this force, a balancing mass (m_2) may be attached in the same plane of rotation as that of disturbing mass (m_1) such that the centrifugal forces due to the two masses are equal and opposite.



Balancing of a single rotating mass by a single mass rotating in the same plane.

Let r_2 = Radius of rotation of the balancing mass m_2 (*i.e.* distance between the axis of rotation of the shaft and the centre of gravity of mass m_2).

$\therefore$ Centrifugal force due to mass m_2 ,

$$F_{C2} = m_2 \cdot \omega^2 \cdot r_2 \quad \dots (ii)$$

Equating equations (i) and (ii),

$$m_1 \cdot \omega^2 \cdot r_1 = m_2 \cdot \omega^2 \cdot r_2 \quad \text{or} \quad m_1 \cdot r_1 = m_2 \cdot r_2$$
