65. We use conservation of mechanical energy. The center of mass is at the midpoint of the cross bar of the **H** and it drops by $L/2$, where $L$ is the length of any one of the rods. The gravitational potential energy decreases by $MgL/2$, where $M$ is the mass of the body. The initial kinetic energy is zero and the final kinetic energy may be written $\frac{1}{2}I\omega^2$, where $I$ is the rotational inertia of the body and $\omega$ is its angular velocity when it is vertical. Thus

$$0 = -MgL/2 + \frac{1}{2}I\omega^2 \implies \omega = \sqrt{MgL/I} \ .$$

Since the rods are thin the one along the axis of rotation does not contribute to the rotational inertia. All points on the other leg are the same distance from the axis of rotation, so that leg contributes $(M/3)L^2$, where $M/3$ is its mass. The cross bar is a rod that rotates around one end, so its contribution is $(M/3)L^2/3 = ML^2/9$. The total rotational inertia is $I = (ML^2/3) + (ML^2/9) = 4ML^2/9$. Consequently, the angular velocity is

$$\omega = \sqrt{\frac{MgL}{I}} = \sqrt{\frac{MgL}{4ML^2/9}} = \sqrt{\frac{9g}{4L}} \ .$$