Use torque to solve this problem ... and a bit of kinematics, too.

First, we will find the angular acceleration of the roll.

$$\vec{\tau}_{pull} = \vec{r} \times \vec{F} = |R||F| \sin 90° \ \underline{\text{into}}$$

$$\vec{\tau}_{fric} = 1.2 \text{ N}\cdot\text{m out (against the motion)}$$

$$\Rightarrow \vec{\tau}_{tot} = \vec{\tau}_{pull} + \vec{\tau}_{fric} = (0.2 \text{ m})(20 \text{ N}) \ \underline{\text{in}} - 1.2 \text{ N}\cdot\text{m} \ \underline{\text{out}}$$

$$= 4 \text{ N}\cdot\text{m} - 1.2 \text{ N}\cdot\text{m} = 2.8 \text{ N}\cdot\text{m} \ \underline{\text{in}}$$

So angular acceleration is

$$\vec{\alpha} = \frac{\vec{\tau}_{tot}}{I} = \frac{2.8 \text{ N}\cdot\text{m} \ \underline{\text{in}}}{\frac{1}{2}(0.35 \text{ kg})(0.2 \text{ m})^2} = \frac{2.8 \text{ N}\cdot\text{m} \ \underline{\text{in}}}{0.007 \text{ kg}\cdot\text{m}^2} = 400 \frac{\text{rad}}{\text{s}^2} \ \underline{\text{in}}$$

The linear acceleration of the strip of paper is

$$|a| = |R||\alpha| = (0.2 \text{ m})(400 \tfrac{\text{rad}}{\text{s}^2}) = 80 \text{ m/s}^2$$

is constant so can use kinematic eqns

So in order to reach a length of $L = 1.0$ m, Joe must pull for

$$L = \cancel{v_0 t} + \frac{1}{2}at^2 \Rightarrow t = \sqrt{\frac{2L}{a}}$$

$$= \sqrt{\frac{2 \cdot (1.0 \text{ m})}{80 \text{ m/s}^2}} = \boxed{0.16 \text{ s}}$$

not very long.