Because of your physics background, you have been able to get a job with a company devising stunts for an upcoming adventure movie being shot in Pittsburgh.

In the script, the hero has been fighting the villain on the top of the locomotive of a train going down a straight horizontal track at 20 mph. He has just snuck on the train as it passed over a river so he is wearing his rubber wet suit. During the fight, the hero slips and hangs by his fingers on the top edge of the front of the locomotive. The locomotive has a smooth steel front face sloped at 20^o from the vertical so that the bottom of the front is more forward that the top. Now the villain stomps on the hero's fingers so he will be forced to let go and slip down the front of the locomotive and be crushed under its wheels. Meanwhile, the hero's partner is at the controls of the locomotive trying to stop the train. To add to the suspense, the brakes have been locked by the villain. It will take her 10 seconds to open the lock. To her horror, she sees the hero's fingers give way before she can get the lock off. Since she is the brains of the outfit, she immediately opens the throttle causing the train to accelerate forward. This causes the hero to stay on the front face of the locomotive without slipping down giving her time to save the hero's life. The movie company wants to know what minimum acceleration is necessary to perform this stunt. The hero weighs 180 lbs in his wet suit. The locomotive weighs 100 tons. You look in a book giving the properties of materials and find that the coefficient of kinetic friction for rubber on steel is 0.50 and its coefficient of static friction is 0.60.