Claims

1. A brake system (15) for a passenger transportation system (1), comprising:

a brake lining (20, 21);

a brake surface (22a, 22b), wherein a gap (39) exists between the brake lining (20, 21) and the brake surface (22a, 22b) when the brake system (15) is in an open position;

an optical monitoring system (40) having a light source (41) arranged to emit light towards at least one of the gap (39) and the brake lining (20, 21), and having a light detector (42) arranged in a light path of the light emitted by the light source (41), the light detector (42) generating an electrical signal as a function of impinging light,

wherein the light source (41) and the light detector (42) are arranged on opposite sides of the gap (39) and the light path extends through the gap (39), wherein the brake lining (20, 21) blocks the light path in a closed position of the brake system (15), or

wherein the light source (41) and the light detector (42) are arranged on one side of the gap (39) and a reflector (54) included in the optical monitoring system (40) is arranged on an opposite side, wherein the reflector (54) reflects light passing through the gap (39) towards the gap (39), and wherein the light detector (42) generates the electrical signal as a function of the reflected light, or

wherein the brake lining has an edge region (55) at a front side of the brake lining (20, 21) that acts upon the brake surface (22a, 22b), wherein the light source (41) and the light detector (42) are arranged in proximity of the edge region (55), wherein the light source (41) emits light towards the edge region (55) that reflects the light towards the light detector (42), and wherein the light detector (42) generates the electrical signal as a function of the reflected light; and

a processor (43) coupled to the optical monitoring system (40) to receive the electrical signal and to generate a predetermined indication if the electrical signal indicates a value that is equal to or greater than a predetermined threshold value (Vmax).

2. The system of Claim 1, wherein the reflector (54) has a reflectance across a width of the gap (39) that changes with a gradient from a high reflectance in proximity of the brake disk (22) to a lower reflectance towards the brake lining (21).

3. The system of Claim 1, wherein the edge region (55) includes one of a polished surface and a surface with applied reflective material.

4. The system of Claim 1 or 3, wherein the surface of the edge region (55) has a reflectance that changes with a gradient across its width.

5. The system of any preceding claim, wherein the processor (43) generates a drive signal having a predetermined frequency to drive the light source (41) to emit light that is modulated according to the predetermined frequency, and wherein the processor (43) operates the light detector (42) to detect light according to the predetermined frequency.

6. The system of any preceding claim, wherein the brake surface (22a, 22b) is one of a lateral surface of a cylinder-shaped brake disk (22), and a cap surface of the cylinder-shaped brake disk (22).

7. A method of monitoring a brake system (15) of a passenger transportation system (1), wherein the brake system (15) includes a brake lining (20, 21), and a brake surface (22a, 22b), wherein a gap (39) exists between the brake lining (20, 21) and the brake surface (22a, 22b) when the brake system (15) is in an open position, comprising:

activating a light source (41) of an optical monitoring system (40) to emit light towards at least one of the gap (39) and the brake lining (20, 21);

generating by a light detector (42) arranged in a light path of the light emitted by the light source (41) and belonging to the optical monitoring system (40) an electrical signal as a function of impinging light,

wherein the light source (41) and the light detector (42) are arranged on opposite sides of the gap (39) and the light path extends through the gap (39), wherein the brake lining (20, 21) blocks the light path in a closed position of the brake system (15), or

wherein the light source (41) and the light detector (42) are arranged on one side of the gap (39) and a reflector (54) included in the optical monitoring system (40) is arranged on an opposite side, wherein the reflector (54) reflects light passing through the gap (39) towards the gap (39), and wherein the light detector (42) generates the electrical signal as a function of the reflected light, or

wherein the brake lining has an edge region (55) at a front side of the brake lining (20, 21) that acts upon the brake surface (22a, 22b), wherein the light source (41) and the light detector (42) are arranged in proximity of the edge region (55), wherein the light source (41) emits light towards the edge region (55) that reflects the light towards the light detector (42), and wherein the light detector (42) generates the electrical signal as a function of the reflected light; and

generating by a processor (43) a predetermined indication if the electrical signal indicates a value that is equal to or greater than a predetermined threshold value (Vmax).

8. The method of Claim 7, further comprising generating by the processor (43) a drive signal having a predetermined frequency to drive the light source (41) to emit light that is modulated according to the predetermined frequency, and operating the light detector (42) to detect light according to the predetermined frequency.

9. The method of one of Claims 7 or 8, further comprising stopping operation of the passenger transportation system (1) in response to generating the indication.

10. The method of one of Claims 7 - 9, further comprising generating a service request message in response to generating the indication.

11. The method of one of Claims 7 – 10, further comprising determining the electrical signal when the brake system (15) is in a fully closed position, and using the electrical signal to control supply of electrical power to a drive (9).

12. The method of Claim 11, further comprising setting the brake system (15) to a partially open position, determining the electrical signal at the partially open position and using the electrical signal to coordinate buildup of motor torque.