

VEDLEGG 1.a-eng. (engelsk versjon)

1.1 Vurderte forhold i kompatibilitets- utredningen.

Top events (riskanalysis): from risk analysis manual	Avs STT STO Bra PSP PLO PSS	(Derailment) (Collision train - train) (Collision train – other object) (Fire) (Persons injured on platform, in train (independent of speed and location) or during entering and leaving train) (Persons injured at rail – road crossing) (Person injured in or close to the open track (not in passenger platform areas))
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Other harmful events:	HMS MJØ Sam ?	(Hazard for health. Harmful, risky conditions for staff) (Pollution or noise to environment in ordinary or extraordinary operating conditions.) (Lack of compatibility causes infrastructure installations to have hazardous function or reduced economy.) (Only used on general topics where possible unwanted incidents cannot be established before more detailed information is available)
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K 1.1	Description of use /general specification	<ul style="list-style-type: none"> Type of rolling stock Main design features
K 1.2		<ul style="list-style-type: none"> Purpose / intended use Speed (signed speed or faster speed in curves?) Which railway lines Intended duration of use Seasons of the year
K 1.3		<ul style="list-style-type: none"> Built according to which regulations / standards / TSI. Previous approval in Norway and abroad. Previous operation in Norway and abroad.

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 2		Id 2 is unused.	

1 ANNEX 1.a-eng. (English version)

1.1 Considered subjects in the homologation

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 3.1.1	Compatibility with track and profile (except panto-graph)	Static strain on track too large: <ul style="list-style-type: none"> Weight (max fuel and freight load) Distribution of axle load: <ul style="list-style-type: none"> - between axles - between wheels on axle Allowable axle load dependent of wheel size $\Sigma P/L$ (max weight per meter) P/a (axle load / min distance between wheels) P/b (axle load/ distance from outer wheel to coupling end) 	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 3.1.2		<p>Dynamic strain on track too large by:</p> <ul style="list-style-type: none"> • max speed on the section of line • max tractive and braking effort • min. radius of curves. <p>Evaluation based on:</p> <ul style="list-style-type: none"> • Track force (measurement?) • Nominal wheel profile and limits for wear. • Redistribution of load between wheels because of uneven track • Activation of magnetic rail friction brake only by emergency • Longitudinal displacement of track • Crosswise displacement of track • Free space for flange of wheel between guiding edges of the check rail and the running edge of the nose in turnouts (ledevidde sporveksler). 	Avs Sam
K 3.2		<p>Allowable curve radius not sufficient for railway line.</p> <ul style="list-style-type: none"> - vehicle alone - coupled - S-curves <p>Vert. radius: \cap and \cup</p>	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 3.3.1		<p>Free line profile exceeded static or dynamic by max speed and track failure on every line section. (Special tools in transport position.)</p> <ul style="list-style-type: none"> • Width (incl. protruding details like mirrors) • Height (incl. antennas) • Vert. og hor. curve profile enlargement in the middle and at the ends • By min. / max wheel size. 	STO Sam
K 3.4		<p>Free profile around top of rail.</p> <ul style="list-style-type: none"> • Special tools on track maintenance machines when in transport mode. • Non-standard wheel-flange profile 	Avs Sam
K 3.5		<p>Missing flange lubrications increases wearing of rail and wheels on other trains.</p> <ul style="list-style-type: none"> • Flange lubrication installed? • Amount of lubrication and spot for application of lubrication on wheel according to JBV requirement. • Lubrication of rail edge by another method? 	Sam
K 3.6.1		<p>Pressure surge in tunnels too large</p> <ul style="list-style-type: none"> • For other trains in opposite direction • For infrastructure installations in the tunnels 	PSP Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 4.1	Compatibility with power supply system.	Capacity of safety grounding of parts of vehicle sufficient for short circuit current of power supply in order to ensure safe operation of line protection. <ul style="list-style-type: none"> grounding according to regulation. doors / door locks Moving parts. (for instance on excavators) Rotating parts (for instance between top and bottom part of excavators). 	Bra PLO PSS Sam
K 4.2		Train suitable for max / min height of catenary in Norway.	Sam
K 4.3		Technical interlocking to prevent connection of power supplies: <ul style="list-style-type: none"> Catenary 1000 V supply. 400 V supply 230 V supply Other power supplies?	PSP Sam
K 4.4		Pantograph deviation from middle of track (in order to assure that it always hits the contact wire). Request for verification by test-driving	PSS Sam
K 4.5		Free profile for pantograph (in order to prevent collision with infrastructure elements). Varies with class of railway line.	PSS Sam
K 4.6		Pantograph and current collector – request for testing and approval	Sam
K 4.7		Current collecting material (coal) – request for testing and approval	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 4.8		Pantograph vertical upward force: <ul style="list-style-type: none"> Specification static force Specification dynamic average force Measurement average force. Simulation /calculation of average force. 	Sam
K 4.9		Request for automatic lowering of pantograph in case of current collector defect.	Sam
K 4.10		Minimal distance between active pantographs in same train (dependent of class of catenary).	Sam
K 4.11		Vehicle compatible with specification for: <ul style="list-style-type: none"> Max / min catenary voltage for class of line. Automatic low voltage power shut off and disconnection. Transient over voltage Request for testing /documentation. 	Sam
K 4.12		Frequency variation: <ul style="list-style-type: none"> which must be sustained without problem. which may be generated when regenerative braking. 	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 4.13		Restrictions on use because of large current consumption. <ul style="list-style-type: none"> • Min time or distance interval between successive trains. • Not simultaneous start up by crossing. • Restriction on max current from catenary in single operation or with 2 or more units in one train. 	Sam
K 4.14		<ul style="list-style-type: none"> • Technical limitation of max current adjustable for engine driver. • Power factor by tractive and regenerative braking. • Request for testing / documentation 	Sam
K 4.15		<ul style="list-style-type: none"> • Co-ordination of protective disconnection in vehicle and line-protection • Request for test / documentation. 	Bra PSP PSS Sam
K 4.16		Instability (linear or unlinear) occurs (weak Norwegian power supply): <ul style="list-style-type: none"> • High impedance catenary • instability in position of rotor in rotating converters occurs. • instability with static convertors. • by tractive or regenerative braking. • influence of drivers routine (rough driving with fast changes in power) • slip / sliding . • requested testing / documentation. 	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 4.17		Too low pantograph upward force in not moving trains causes current to melt off catenary. <ul style="list-style-type: none"> • interlocking by falling air-pressure. 	PSS Sam
K 4.18		Request for information necessary for JBV's simulation of the power supply system.	Sam
K 4.19		Recording of energy installed or prepared: <ul style="list-style-type: none"> • consumed energy • regenerated energy 	Sam
K 5.1	Compatibility with infrastructure signalling and communication installations.	Current in track cause negative influence on infrastructure installations. <ul style="list-style-type: none"> • exceeding limits for restricted frequencies • limits applies to complete train (multiple operation) • emergency operation in case of technical defect. • weather dependent problem, especially sleet (isbelegg) on the contact wire. • noise current dependent of drivers routine? • no automatic disconnection 95 /105 Hz 	STT PLO PSS Sam
K 5.2.1		Not reliable detection by track circuits <ul style="list-style-type: none"> • axle load too low • electrical resistance between wheels • max distance axle – axle and axle – vehicle outer end. 	STT PLO PSS Sam
K 5.2.2		Not reliable detection by axle counter system <ul style="list-style-type: none"> • wheel profile wrong • wheel material wrong 	STT PLO PSS Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 5.2.3		Tale magnetic device not functioning properly effektiv (only on line Hamar – Elverum - Støren) <ul style="list-style-type: none"> not possible to fasten the device snow-plough or other equipment: <ul style="list-style-type: none"> - mechanically occupying necessary space - screens off or in other way cause bad function. 	STT PLO PSS Sam
K 5.3		ATC-installation in vehicle <ul style="list-style-type: none"> Analysis of the modification of the class of rolling stock . Approval for every installation. 	STT Avs Sam
K 5.4		Electromagnetic noise emission exceeds standard or cause malfunction of infrastructure installations. <ul style="list-style-type: none"> EN 50121 Earlier experiences of interference. 	STT PLO PSS : Sam
K 6.1	Compatibility with infrastructure telecommunication installations.	GSM-R train radio. Installed telephone model and sot-ware in it must have type approval or preliminary approval from JBV.	Sam
K 7.1	Preparation for extraordinary handling /situations.	Parking <ul style="list-style-type: none"> Parking brake capacity in gradients compared with line gradients Drag shoes (bremsesko)? 	STT STO PLO Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 7.2		Marking of items important in rescue operation or otherwise available on location rescue is done.: <ul style="list-style-type: none"> lifting points safety critical control mechanism safety critical indications connection for filling or draining 	Sam PSP MJØ
K 7.3		Connection to other rolling stock: <ul style="list-style-type: none"> Connection to UIC-coupling possible? All necessary equipment for connection in one end available in train? Mechanical strength of coupling? Maximum 1 person in addition to train staff necessary to do coupling. Safety of staff when coupling. / Bernerspace by coupling. Compatible with UIC-brake? 	Sam PSP
K 7.4		Does the vehicle have capacity for rescue hauling of other rolling stock if this is necessary in order to reopen normal traffic?	Sam
K 7.5		Portable equipment in order to ease reestablishment of traffic in case of disruption: <ul style="list-style-type: none"> CTC-key (Centralized Train Control-key) drag shoes (bremsesko) device for connection to standard UIC-coupling of rescue train (if necessary) 	STT Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 8.1	Compatibility with traffic management and track capacity.	Insufficient speed for other traffic on line necessitate restriction: <ul style="list-style-type: none"> slow speed in upward gradients (low power). downward gradients (thermal capacity of brakes limits speed), curves max speed 	Sam
K 8.2		Insufficient capacity in difficult operating conditions. <ul style="list-style-type: none"> capacity for clearing snow in track slippery rails varies with railway line. 	Sam
K 8.3		Insufficient reliability. <ul style="list-style-type: none"> Special precautions necessary to prevent risk of delay for other traffic? 	Sam
K 8.4		Communication with traffic management <ul style="list-style-type: none"> train radio mobile telephone train telephone (special Norwegian device) 	Sam
K 8.5		<ul style="list-style-type: none"> ATC not installed in self-propelled vehicle. 	STT Avs Sam
K 8.6		Too slow passenger exchange: <ul style="list-style-type: none"> door capacity disabled persons / wheelchairs 	Sam
K 8.7		Air pollution from vehicles (dieselengine or preheating / steam-locomotive?) <ul style="list-style-type: none"> tunnels underground passenger stations 	Sam

ID no.	Function preventing top event	Possible hazards / problems to be considered	Top event
K 8.8		Insufficient access for staff to infrastructure installations from rolling stock: <ul style="list-style-type: none"> - entering and leaving rolling stock at and outside platform area. 	Sam
K 9.1	Compatibility with requirement for environmental protection	Line dependent restriction on use of toilet <ul style="list-style-type: none"> Applies to stock with toilets without retention tank. 	Sam