Norwegian Safety Investigation Authority

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REPORT ON MOTORCYCLE ACCIDENT AT GJØVIK DRIVER AND VEHICLE LICENSING OFFICE IN HUNNDALEN IN GJØVIK MUNICIPALITY, 10 JULY 2020

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This report has been translated into English and published by the NSIA to facilitate access by international readers. As accurate as the translation might be, the original Norwegian text takes precedence as the report of reference.

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REPORT ON ROAD TRAFFIC ACCIDENT

Date and time:	Friday 10 July 2020, at 10:11
Location:	Hunndalen, Gjøvik municipality, Innlandet county
Accident type:	Run-off-the-road accident
Vehicle type:	Heavy motorcycle, Suzuki SFV650A, 2012 model
Type of transportation:	Motorcycle training

NOTIFICATION OF THE ACCIDENT

The Norwegian Safety Investigation Authority (NSIA) was not notified about the accident, but became aware of it through the media. On Tuesday 14 July 2020, the NSIA contacted the police and obtained relevant information about the accident. The NSIA decided to open an investigation based on the information obtained.

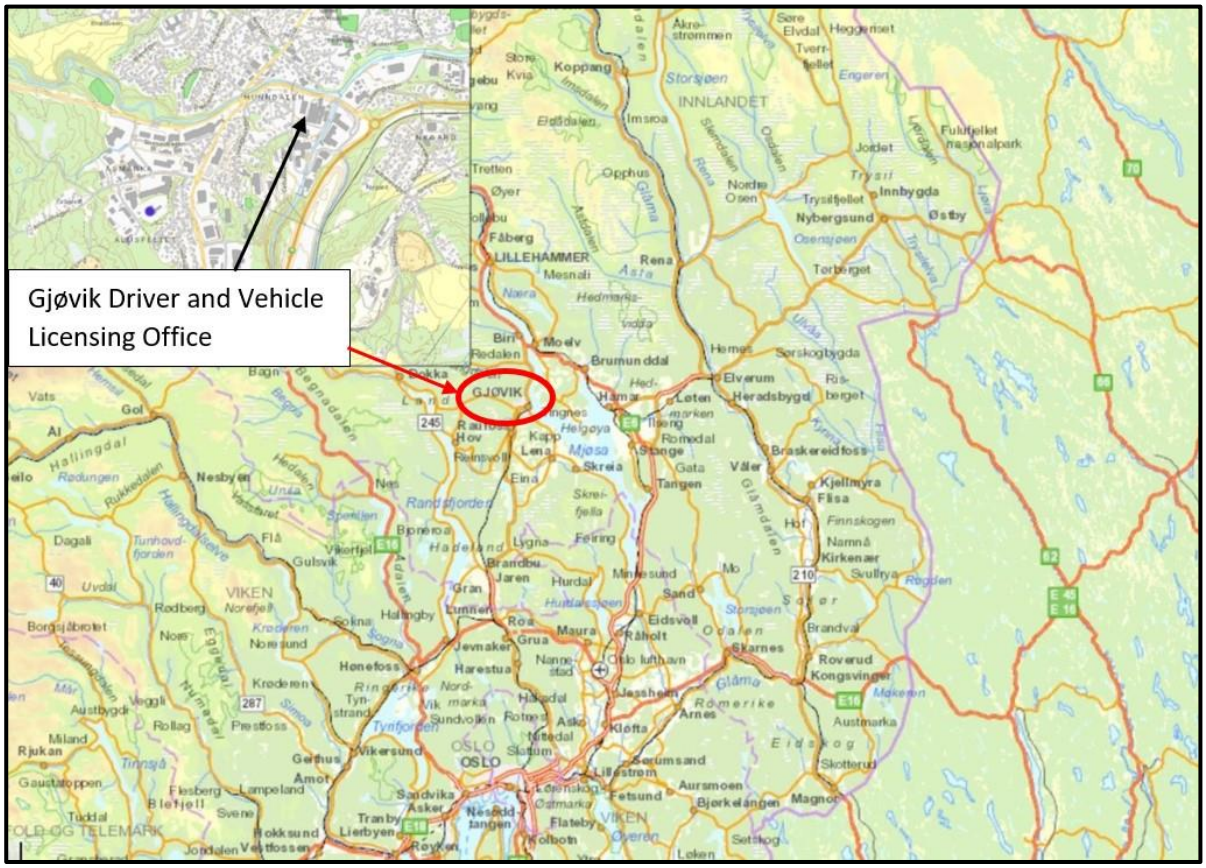

Figure 1: The accident happened in the training area at Gjøvik Driver and Vehicle Licensing Office in Hunndalen, situated about three kilometres west of Gjøvik town centre. Map: Kystinfo, Kystverket. Illustration: NSIA

SUMMARY

On Friday 10 July 2020, a learner died during the second practical lesson of a heavy motorcycle training programme. The learner was practising turning techniques in the training area of Gjøvik Driver and Vehicle Licensing Office, when an accidental throttle input occurred and the learner lost control of the motorcycle. The learner rode out of the training area, down a slope in the terrain, and subsequently crashed into the wall of an industrial building. The learner died instantly from crush injuries to the upper body.

The motorcycle, a Suzuki SFV650A, is frequently used for training purposes. It is a heavy motorcycle that is relatively easy to handle. It has a high torque, however, which means that it accelerates fairly rapidly at low rpm levels. Since the accident, the driving school has changed its practice so that all learners with no previous experience of motorcycles start their training on a light motorcycle (125cc) even though they meet the age requirements for heavy motorcycles.

At the time the accident occurred, the instructor was responsible for three learners in total, two of whom were undergoing training on heavy motorcycles, but at different skill levels. The third learner was taking a refresher lesson before the practical riding test for light motorcycles. The instructor was not riding along with the learner who lost control, nor did the instructor use the remote kill switch or communication equipment, and therefore had no possibility of intervening in the situation that arose. The training area had no railings or other barriers to secure the slope. The difference in elevation between the training area and the terrain where the industrial building was situated was 3.4 metres.

No requirements have been set for the implementation of risk assessments or safety measures in connection with the planning, design and use of the Norwegian Public Roads Administration's (NPRA) training areas, over and above the guidelines for administering driving tests ('Retningslinjer for gjennomføring av førerprøve i alle klasser' – in Norwegian only). Nor has the NPRA established an internal approval procedure for training areas in its quality system for safe design and use.

The investigation has also shown that there is no reporting system for undesirable incidents and accidents that occur in connection with training in the driving school industry. The industry consists of many small entities (driving schools etc.), spread across the country, and a reporting system could help to achieve more learning and experience transfer between them.

The NSIA submits three safety recommendations in connection with the investigation.

1. FACTUAL INFORMATION

1.1 Sequence of events

At 9:30 on Friday 10 July 2020, a learner rider (learner 1) died during the second practical lesson of a heavy motorcycle training programme. On the day in question, the learner was practising turning techniques in the training area at Gjøvik Driver and Vehicle Licensing Office. The training area[1] is situated in an industrial area, only separated from the closest industrial building by a slope covered in low-growing vegetation and sharp gravel.

The instructor was helping two other learners at the same time. One of them (learner 2) was taking a light motorcycle refresher lesson, and the other (learner 3) was undergoing heavy motorcycle training. There was also another instructor present in the training area when the accident occurred. The second instructor was training a learner (learner 4) on a heavy motorcycle.

At the exit of a sharp bend, in the area where the two instructors were standing to observe the learners, an accidental throttle input occurred on learner 1's motorcycle. According to witnesses, the learner was left hanging on the handlebars with rigid arms, and was unable to regain control of the motorcycle. The learner rode out of the training area, continued down the slope by the training area, and subsequently crashed into the wall of an industrial building (see Figure 2).

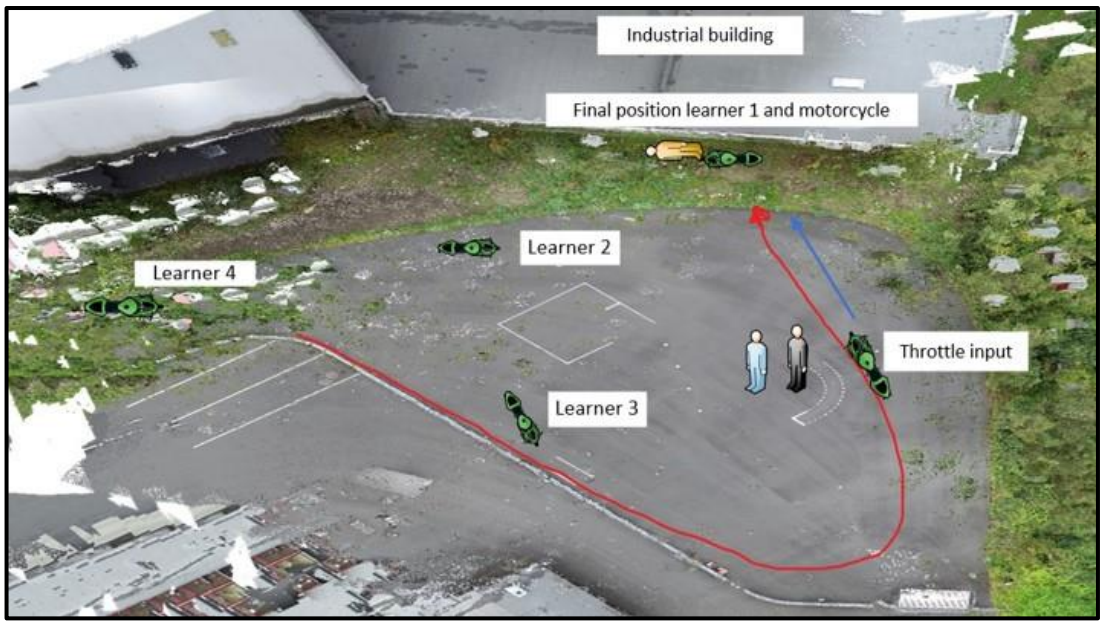

Figure 2: Illustration of the sequence of events in the accident. The yellow figure illustrates the final position of learner 1. The blue line illustrates the distance between the point at which the throttle input occurred and the edge of the tarmac in the training area. Illustration: NSIA

The difference in elevation between the edge of the tarmac in the training area and down to the industrial building was 3.4 metres. There were no railings or other barriers separating the training area from the surrounding terrain. Figure 3 shows the slope where the motorcycle drove into the terrain.

[1] The definition of a training area is: 'A closed-off area for practising or testing driving skills'.

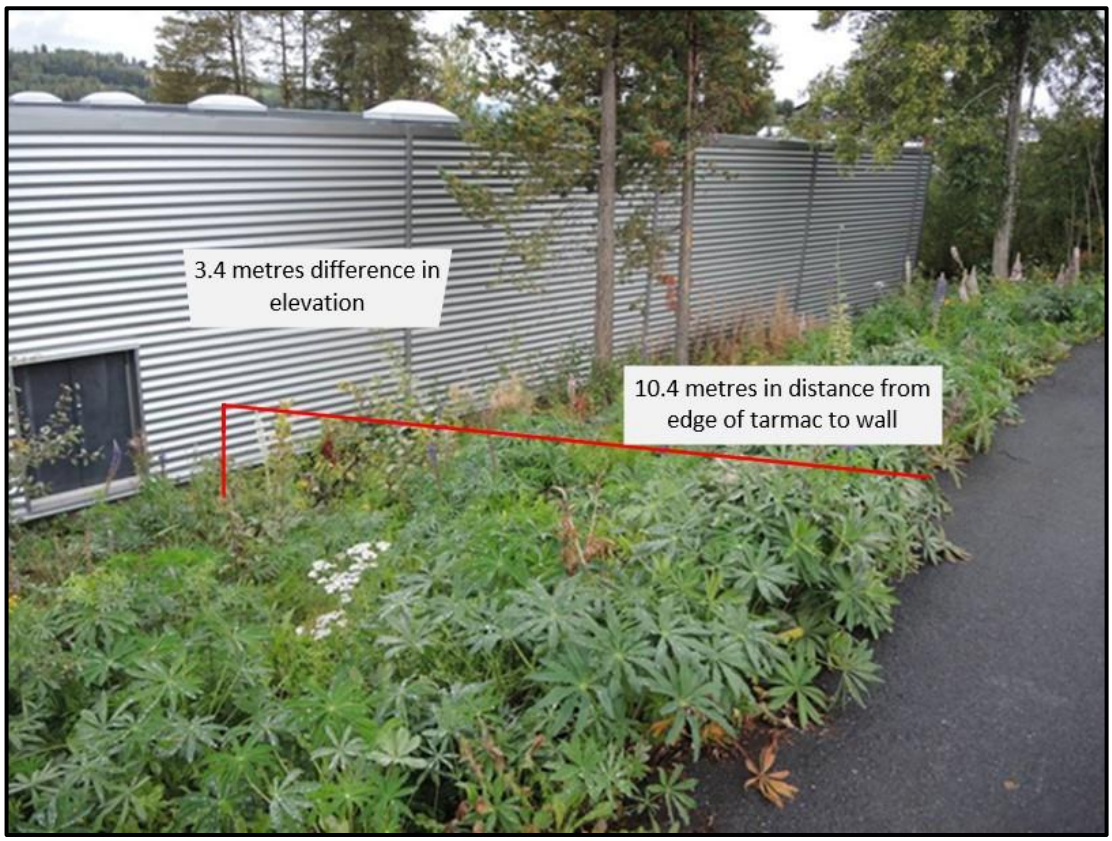

Figure 3: Distance from the industrial building to the edge of the tarmac in the training area where the motorcycle drove into the terrain. Photo: NSIA

Witnesses have estimated that the motorcycle was travelling at a speed of approximately 15–20 km/h when the accidental throttle input occurred and the learner lost control of the motorcycle. The distance from the point at which the throttle input occurred to the edge of the tarmac in the training area was approximately 20 metres.

Witnesses have estimated that it took approximately two seconds from the throttle input occurred until the motorcycle crashed into the industrial building. The motorcycle was in first gear at the time it crashed, and it accelerated quickly. The motorcycle may have reached a speed of up to 45 km/h when the learner drove out of the training area.

1.2 Rescue operations

The two driving instructors quickly arrived at the scene of the accident and removed the motorcycle, which was partly lying on top of the learner. They performed cardiopulmonary resuscitation (CPR), and then called the medical emergency number (113). The fire and rescue service arrived at the scene of the accident approximately ten minutes after the accident occurred, and took over CPR until the ambulance arrived shortly afterwards. The learner was pronounced dead at 10:49.

1.3 Survival aspects

1.3.1 Safety equipment

The learner was wearing approved safety equipment at the time of the accident. It included a full-face helmet with a visor, a motorcycle jacket with a back panel, motorcycle trousers, motorcycle boots and motorcycle gloves.

The driving instructor responsible for the learner has informed the NSIA that aids such as communication equipment or a remote kill switch were not used during training on the day of the accident.

1.4 Vehicle damage

The motorcycle sustained major damage to its front as a result of crashing into the industrial building (see Figure 4). The motorcycle also sustained major damage on its left side, including a bent front fork and handlebars, as a result of the crash.

Figure 4: Damage to the motorcycle. Photo: NSIA

1.5 Other damage

The wall of the industrial building sustained minor damage as a result of the crash (see Figure 6).

1.6 The site of the accident

1.6.1 Location

The accident happened in the training area at Gjøvik Driver and Vehicle Licensing Office in Hunndalen, situated about three kilometres west of Gjøvik town centre. The training area is situated on the northern side of the Driver and Vehicle Licensing Office (see Figure 5).

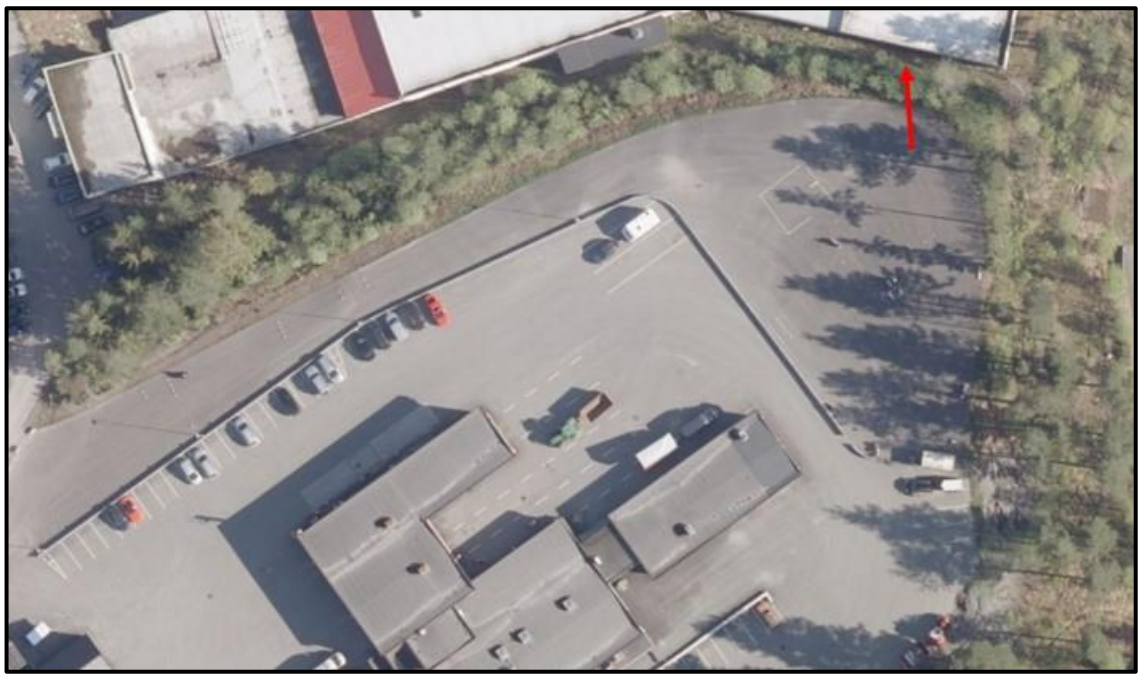

Figure 5: Overview of the training area at Gjøvik Driver and Vehicle Licensing Office. The red arrow indicates where the learner most likely went over the edge of the tarmac in the training area and down the slope towards the industrial building. Photo: Gule Sider

1.6.2 Marks registered at the accident site

Examinations of the accident site showed that the motorcycle left no skid marks or other marks in the training area. Nor were clear marks found on the tarmac or on the slope that could prove the exact point at which the motorcycle went off the edge or the point at which it landed.

Marks from the motorcycle were found on the exterior wall of the industrial building. The building sustained damage to the wall consistent with the front of the motorcycle or the right handlebar (see Figure 6).

Pieces of mirror and of the learner's helmet were found in the vegetation on the slope between the training area and the industrial building.

Figure 6: An aluminium strip on the wall of the industrial building was torn off in the crash. Photo: The police

1.6.3 Registration of distances at the accident site

The NSIA used a drone to measure relevant distances at the accident site, and to register the difference in elevation between the training area and the industrial building.

The distance from the point in the training area where the accidental throttle input occurred to the edge of the tarmac at the end of the training area was registered as approximately 20.5 metres. The distance between the edge of the tarmac and the exterior wall of the industrial building was registered as approximately 10.4 metres. The slope between the tarmac edge of the training area and the wall of the industrial building was measured to a length of approximately 11 metres, with a difference in elevation of approximately 3.4 metres. This means a gradient of approximately 30 degrees (see Figure 7 and Figure 8).

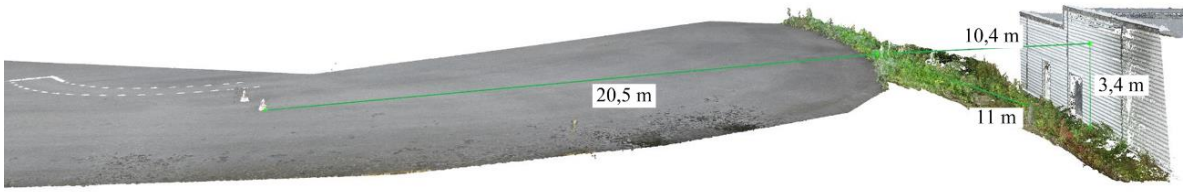

Figure 7: Survey of the accident site, seen from the east. Illustration: NSIA

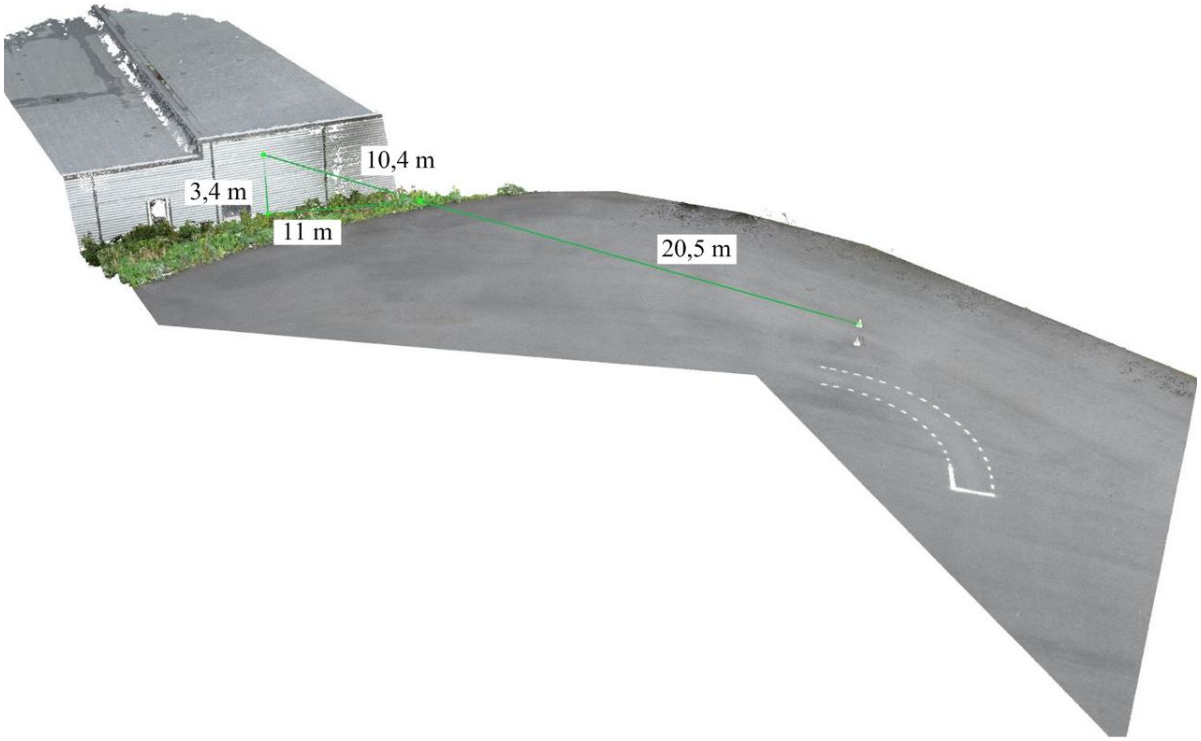

Figure 8: Survey of the accident site, seen from above. Illustration: NSIA

1.7 Road users

1.7.1 Motorcycle rider

The motorcycle rider (hereafter referred to as the learner) was 49 years old at the time of the accident, and had a category B driving licence.

At the time of the accident, the learner was undergoing the second practical lesson of a heavy motorcycle training programme. The first lesson was completed the day before the accident. The learner had no previous practical experience of motorcycles.

1.7.2 Driving instructor

The driving instructor had been employed at the driving school since 2014, and had been providing motorcycle training since 2015. The instructor was approved as a driving instructor for driving licence categories A and B.

1.7.3 Other road users

There were a total of six road users present in the training area at the time of the accident. One of the instructors was responsible for a total of three learners (including the deceased), and the other instructor was responsible for one learner. The four learners were undergoing training on light and heavy motorcycles, and they were all at different skill levels.

Table 1 shows an overview of all road users present in the training area at the time of the accident, including information about their skill level and the type of vehicle used.

Table 1: Overview of road users present in the training area at the accident site. The learners belonging to driving instructor 1 are marked in blue. The learner belonging to driving instructor 2 is marked in orange.

Road user	Vehicle type	Skill level
Learner 1	**Heavy motorcycle**	**Step 2**
Learner 2	Light motorcycle	Step 4 Refresher lesson before practical riding test
Learner 3	Heavy motorcycle	Step 2
Learner 4	Heavy motorcycle	Step 2
Driving instructor 1	None	Instructor
Driving instructor 2	None	Instructor

1.8 Vehicle

1.8.1 The motorcycle

The motorcycle was a Suzuki SFV650A (2012 model). It belonged to vehicle group L3E, and the odometer reading at the time of the accident was 26,090 km. The motorcycle was approved as a training vehicle, and was equipped with an extra handle, gear lever and brake for the co-rider (instructor). It was equipped with ABS brakes.

The motorcycle was 213 cm long and 76 cm wide, with an unladen weight of 205 kg. The unladen weight including the driver was 280 kg, and the maximum permissible weight was 420 kg. The maximum payload was 140 kg, and the maximum front and rear axle loads were 150 kg and 270 kg, respectively. The motorcycle had an engine output of 53 KW (72 HK), and a maximum speed of 200 km/h.

Both tyres were of the type ‘Michelin Road 5’, with a W speed rating (270 km/h). The tyre dimensions were 120/70ZR17M/C (front) and 160/60ZR17M/C (back). The tread depth was approximately 3.0 mm on the front wheel and approximately 5.0 mm on the back wheel. The tyre pressure was between 2.0 and 2.5 bar.

The motorcycle was first registered in Norway on 4 June 2012. It was registered with the learner’s driving school as the owner from 1 July 2019.

Motorcycles are not covered by the Regulations of 13 May 2009 No 591 relating to periodic roadworthiness tests for motor vehicles and their trailers.

Figure 9: The motorcycle was of the type 'Suzuki SFV650A'. Photo: NSIA

1.8.2 Technical investigations

Representatives of the NPRA and the NSIA examined the technical condition of the motorcycle on 9 September 2020. No faults or defects were found in the motorcycle. The technical condition of the motorcycle was considered to have been good prior to the accident.

1.9 Weather and driving conditions

The tarmac in the training area was dry at the time of the accident. According to the police, the air temperature was 18 °C when response personnel arrived at the scene, and the weather was dry and sunny in the area.

1.10 Training area

The accident occurred in a training area used by the NPRA for driving tests at Gjøvik Driver and Vehicle Licensing Office. It is situated in separate tarmacked area on the northern side of the Driver and Vehicle Licensing Office. The total size of the training area is 2,800 square metres, and the area in which the learner underwent driving practice is 1,725 square metres (see Figure 10).

The design of the training area is based on the guidelines for administering driving tests, and the last risk assessment of the area was carried out in 2009 (see section 1.12.3). In autumn 2019, excavation work took place on the slope for the purpose of installing district heating for the Driver and Vehicle Licensing Office. This meant that some vegetation was removed and the slope was covered in sharp gravel, which is partly covered by vegetation.

The training area is also available for training under the auspices of driving schools, but no risk assessment has been carried out of its use or the choice of solutions, as is the case for training areas at some other driver and vehicle licensing offices.

Figure 10: Overview of training area. The area where the learner was practising is marked in blue. Photo: © Norwegian Mapping Authority. Illustration: NSIA

1.11 Medical factors

The conclusion in the post-mortem report was that the learner died instantly from crush injuries sustained in the crash.

A toxicology test was conducted of the learner after the accident. It was negative. The NSIA has no information about any other medical factors that may have had a bearing on the accident.

1.12 Laws and regulations

1.12.1 Requirements of driving schools

1.12.1.1 *General information*

Driving schools are regulated by the Act of 18 June 1965 No 4 relating to road traffic (the Road Traffic Act) and the pertaining Regulations of 1 October 2004 No 1339 concerning driver training and driving tests etc. (the Driver Training Regulations). The Act of 11 June 1976 No 79 relating to the control of products and consumer services (the Product Control Act) and the Regulations of 6 December 1996 No 1127 relating to systematic health, environmental and safety activities in enterprises (the Internal Control Regulations) are also applicable.

The NPRA is the supervisory authority for driving schools through Section 5-11 of the Driver Training Regulations. Driving schools that offer driver training must be approved by the NPRA. In that connection, the driving school must document that it has an approved manager responsible for the curriculum (professional manager) and approved

instructors. A curriculum for the compulsory training for each individual vehicle category, and a list of learners, must also be provided.

Other specific requirements of driving schools are regulated in Section 5-3 of the Driver Training Regulations. The NPRA approves the driving schools' teaching programme for training for a category A driving licence.

1.12.1.2 *Driving practice*

According to Section 2-3 of the Driver Training Regulations, there must be visual contact between the instructor and the learner during motorcycle training. There are no requirements for two-way communication between the instructor or the accompanying rider during practice in a closed-off area. The requirement that instruction must be possible through two-way communication between the instructor and the accompanying rider only applies to driving practice in areas that are not closed off; see Section 2-2 of the Driver Training Regulations. Pursuant to Section 2-3 of the Driver Training Regulations, each instructor may provide motorcycle training for up to three learners at the same time.

1.12.1.3 *Requirements of training vehicles – motorcycles*

General requirements for training vehicles are regulated by Section 4-2 of the Driver Training Regulations. The motorcycle must have equipment for an accompanying rider. That includes a double set of brake and clutch levers, as well as an extra mirror, giving the instructor sufficient views to the rear and the possibility of keeping control of the learner. The motorcycle must also have a handle at the back.

The regulations do not set any limitations on the engine output for driving licence category A.

1.12.2 Requirements concerning training

The Driver Training Regulations and Manual V850A Curriculum for driving licence category A[2] regulate what motorcycle training must include.

Chapter 5 of the Driver Training Regulations concerns the responsibility of training institutions in connection with driver training. Section 27 first paragraph of the Road Traffic Act concerns training institutions that provide training for the purpose of obtaining a driving licence.

The NPRA's curriculum serves as guidelines for driving instructors and learners. The curriculum is divided into step-by-step objectives, course goals and sub-goals.

Driver training is hierarchically structured and largely based on the GDE[3] framework.

[2] Norwegian Public Roads Administration (2016). Manual V850A – Curriculum for driving licence category A.
[3] The Goals for Driver Education framework was developed through the EU-funded GADGET project. The GDE framework is recognised by driving schools and instructors, and forms the basis for the curriculum for driving licence category A.

The four steps are divided as follows:

Table 2: Driver training for driving licence category A. Source: Manual V850A

Driver training for driving licence category A			
Step 1 Course in basic road traffic knowledge	Step 2 Basic competence with respect to vehicle and driving	Step 3 Road traffic training	Step 4 Final training
Driver training, basic understanding of road traffic, the human element in road traffic, practice driving and driving experience, first aid, road accident procedures, night driving	*Basic traffic course for driving licence categories A1, A2 and A, basic practical training and step-by-step assessment, cf. Section 7-5.*	*Individual road traffic training, on-the-road safety course, safety course in precise driving technique for driving licence categories A2 and A, step-by-step assessment, cf. Section 7-5.*	*On-the-road safety course and adequate practice*

1.12.3 Requirements of training areas

The NPRA's guidelines for administering driving tests[4] set a minimum requirement for the size of the area where skills exercises are to be performed in the training area. Section 5-1 of the Driver Training Regulations states that the curriculum shall contain a section on the choice of suitable training areas.

Reference is also made to Manual V621 on motorcycle safety:

> *Safety zones must be created that provide adequate safety both laterally and longitudinally in relation to buildings, lamp posts, trees, other traffic etc., to avoid damage/injury in the event of loss of control.*

There is no requirement in the NPRA's quality system to carry out risk assessments of training areas when they are established or of areas in use, over and above that described in the guidelines for administering driving tests.

Driving schools may also use other areas for driver training without having to meet other formal requirements than suitability. It is the responsibility of the individual driving instructor to give due regard to safety when choosing training areas.

1.12.4 Requirements for safety equipment for learner drivers

Learners must wear a mandatory crash helmet, in addition to a transparent visor or goggles, gloves, footwear covering the ankles and appropriate clothing covering other parts of the body. The equipment must be made of a material that will not melt, burn or

[4] Norwegian Public Roads Administration (2020). *Retningslinjer for gjennomføring av førerprøve i alle klasser.*

tear if the vehicle overturns and that offers protection against blows and impact; see Section 4-9 of the Driver Training Regulations.

1.13 Authorities, organisations and leadership

1.13.1 The Norwegian Public Roads Administration

The Norwegian Public Roads Administration (NPRA) is an administrative agency under the authority of the Ministry of Transport, with sector responsibility for roads and road traffic within the bounds defined by the superior authorities.

The NPRA develops rules and guidelines for road design, operation and maintenance, road traffic, road user training and vehicles, including curricula for all driving licence categories. Responsibility for this rests with the Road Users and Vehicles Department, with a dedicated Training section under the Road Users division.

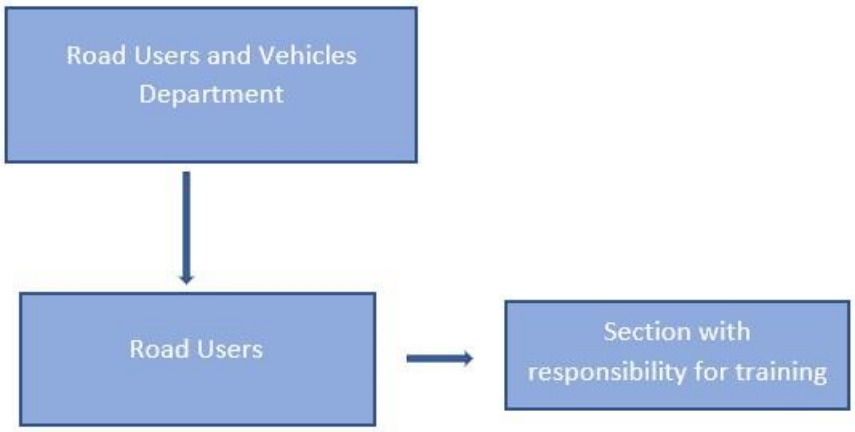

Figure 11: Simplified organisation chart for the Norwegian Public Roads Administration and the Road Users and Vehicles Department. Illustration: NSIA

1.13.1.1 *Supervision and approval authority*

The NPRA is the supervisory authority for driver training and the competent authority for the approval of driving schools. In this context, the NPRA uses a checklist for the supervision of driving schools. The checklist includes the responsibilities and expertise of the professional manager and driving instructors in connection with motorcycle training, and the responsibility of the training institution as regards the choice of motorcycle training areas.

On 12 June 2020, the NPRA carried out an unannounced inspection of the driving school in question, under the legal authority of Section 5-11 of the Driver Training Regulations. The background for the inspection was to check whether Step 3 training for driving licence category A was in accordance with the applicable provisions in the Regulations. Some formal matters were also checked, and no nonconformities were registered in connection with the inspection.

1.13.2 Gjøvik Driver and Vehicle Licensing Office

The NPRA has approximately 70 driver and vehicle licensing offices in Norway. Gjøvik Driver and Vehicle Licensing Office is situated in Hunndalen. It provides theory tests, driving tests, vehicle checks and licence plate services. The Driver and Vehicle Licensing

Office has established a training area that is used, among other things, for light and heavy motorcycle training. The training area is situated on the north-eastern side of the Driver and Vehicle Licensing Office.

Through the NPRA's reporting system, 'Synergi', the Driver and Vehicle Licensing Office can report incidents and nonconformities that arise during driving tests. There is no requirement to report incidents or accidents that arise in connection with practice driving under the auspices of driving schools.

The accident that occurred on 10 July 2020 was reported by Gjøvik Driver and Vehicle Licensing Office in the NPRA's nonconformity system 'Synergi' on 14 July 2020. The accident was reported as an 'undesirable incident – near-accident/dangerous situation'(see section 1.16.1).

1.13.3 Driving school

The driving school was started in 1994. It is approved pursuant to applicable statutory and regulatory requirements and is a member of the Norwegian Driving Schools Association (ATL). The driving school has six driving instructors who provide training in light vehicle categories, two of whom provide training in driving licence category A.

In addition to the compulsory training curriculum, the driving school has drawn up an internal nonconformity form and a half-year plan. The driving school also holds two regular meetings every month with all the driving instructors.

1.14 Accidents involving motorcycles during training

1.14.1 Motorcycle incident at Gjøvik Driver and Vehicle Licensing Office on 19 August 2020

On Wednesday 19 August 2020, another accident occurred in the training area at Gjøvik Driver and Vehicle Licensing Office. This incident also concerned a learner who went over the edge of the training area and drove down a slope on the eastern side of the area, which was not secured either (see Figure 12). The learner sustained no injuries in the incident.

Figure 12: Overview of the training area and the slope (marked in red) where the motorcycle drove over the edge. Illustration: NSIA

This learner was also undergoing training on a heavy motorcycle at the time of the incident, and had little previous experience of riding a motorcycle.

1.14.2 Motorcycle accident in Tromsø on 21 July 2014

At 17:52 on Monday 21 July 2014, a learner died during heavy motorcycle training. The accident happened in a car park at Alkeveien in Tromsø. The learner lost control of the motorcycle during training and collided head-on with a trailer that was parked in the area used for training. The learner died from the injuries he sustained in the accident.

The learner was taking his twelfth lesson at the time of the accident. At the time the accident occurred, there were a number of concrete elements, trailers and equipment for excavators in the area that was used for training (see Figure 13).

Figure 13: The learner drove between the two red cones and collided with the green trailer. Photo: The police

1.15 Additional information

1.15.1 Challenges involved in riding a motorcycle

A manual for motorcyclists published by the State of Nevada's Department of Motor Vehicles[5] states as follows:

> *Successfully piloting a motorcycle is a much more involved task than driving a car. Motorcycling requires a fine sense of balance and a heightened sense of awareness and position amidst other roadway users. A motorcycle responds more quickly to rider inputs than a car, but is also more sensitive to outside forces, like irregular road surfaces or crosswinds.*

The most important factor in relation to safe conduct in traffic is to automate one's driving skills, so that one knows how to act in an undesirable situation, for example in the event of an accidental throttle input. An inexperienced driver has not yet achieved this level of automation, which may cause a delayed reaction and an incorrect understanding of the situation.

The driving instructors at the two driving schools have explained to the NSIA that slightly older learners often need more time on the technical exercises and are a bit 'stiff in the body'.

[5] Department of Public Safety (nv.gov) – Nevada DMV Motorcycle Handbook

The manual from the State of Nevada goes on to state:

> *Smaller motorcycles are usually easier for beginners to operate.*

1.15.2 Experience transfer: passenger car – motorcycle

1.15.2.1 *Opposite operation*

In a car, you normally operate the clutch with your foot and the gears with your arm. On most motorcycles, this is the other way round: You operate the clutch with your arm and the gears with your foot, at the same time as you are required to learn a new gear pattern.

1.15.2.2 *Strength and balance to steer a motorcycle*

A car is normally steered by applying normal arm movements to the steering wheel, which is made relatively easy by modern power steering. Steering a motorcycle is different at slow speeds and when driving on roads above a certain speed. At very low speeds, for example when practising in a training area (crawling), the rider steers the motorcycle by turning in the desired direction. On the road, the motorcycle will turn as a result of a shift in the centre of gravity, either by the rider leaning their body to one side or by steering counter to the desired direction, known as countersteering. This requires learning and practice.

1.15.3 Proposal to introduce a remote kill switch in connection with riding practice in training areas

After the accident, one of the industry organisations for driving schools contacted the Ministry of Transport with a view to improving safety during motorcycle training. They advocated the introduction of a regulatory requirement for a remote kill switch. The NPRA, as the competent authority, has considered the proposal but not reached a decision.

1.16 Implemented measures

1.16.1 The NPRA

The NPRA has followed up the incident in its nonconformity system for undesirable incidents relating to health, safety and the environment. Since the accident, Gjøvik Driver and Vehicle Licensing Office has introduced an arrangement whereby each driving instructor must only be responsible for one learner at a time when using the training area.

1.16.2 Driving school

The driving school prepared a nonconformity report after the accident. The nonconformity report described the sequence of events in the accident and the driving school's assessment of the causes of the accident, and it contained proposals for measures to prevent recurrence, as well as a deadline for implementing measures.

The driving school has informed the NSIA that the following measures have been implemented as a consequence of the accident:

> *Learners who have no previous experience of motorcycles must start their training on a light motorcycle (125cc).*

2. ANALYSIS

2.1 Introduction

The NSIA decided to initiate an investigation into the accident based on the degree of severity, and the fact that the accident occurred during authorised training. Few accidents that happen in connection with driver training result in serious personal injuries. The NSIA nonetheless believes that the accident highlights the need to address safety in connection with the use of training areas during motorcycle training.

The accident and the circumstances surrounding it have been investigated and analysed in line with the NSIA's framework and analysis process for systematic safety investigations (the NSIA method[6]). The sequence of events, from the throttle input on the learner's motorcycle until response personnel arrived at the scene of the accident, has been mapped in a sequential presentation in a STEP[7] diagram.

The analysis start with an assessment of the sequence of events in section 2.2. This includes an assessment of the triggering event and the crash, as well as survival aspects. Motorcycle training vehicles and personal safety equipment are considered in section 2.3. Section 2.4 assesses the design and securing of the training area. The content of the Driver Training Regulations, and the curriculum for driving licence category A, are discussed in section 2.5. The driving school's training curriculum is also considered in this context. Learning from incidents and accidents that occur during training is considered in section 2.6.

According to information the NSIA has obtained, the rescue operation was satisfactory, and it will therefore not be analysed.

2.2 Assessment of the sequence of events

The assessment of the sequence of events is based on the NSIA's survey of the accident site, documentation obtained from the police and the NPRA, and witness statements and interviews the NSIA conducted with road users who were practising at the same time.

The learner lost control of the motorcycle in the training area during the second motorcycle training lesson, and had no previous practical experience of motorcycles. The learner was supposed to practise turning techniques in the training area.

On the day of the accident, in the instructor's assessment, the learner had sufficient skills to be able to ride slowly around the training area on their own. At that time, the instructor had three learners undergoing training at the same time, all at different skill levels.

When the learner lost control, it is natural to assume that the learner tried to hold on to the handlebars of the motorcycle to avoid falling off. The throttle is operated with the right handlebar, and holding on to it can make the situation worse, by maintaining and increasing the input to 'full throttle' and losing control. The result is an uncontrolled, accidental throttle input and ensuing rapid acceleration.

[6] Norwegian Safety Investigation Authority (2018). The NSIA method: Framework and Analysis Process for Systematic Safety Investigations. ISBN 978-82-690725-3-2.
[7] Sequentially Timed Events Plotting.

In the NSIA's assessment, an accidental acceleration can be frightening for inexperienced motorcycle riders, and it refers to the further discussion of suitable vehicles in section 2.3.

The motorcycle went down a slope, and the learner died when the motorcycle crashed into a wall. The slope was not separated from the training area by railings or other physical barriers, and securing of the training area will be further analysed in section 2.4. Personal injuries and damage to the motorcycle indicate that it hit the wall of the industrial building head-on, and that it ended up partly on top of the learner. The learner died instantly in the crash from crush injuries to the upper body. The choice of training vehicle and safety equipment is discussed further in section 2.3.

The investigation has shown that the instructor did not use a remote kill switch or communication equipment during the training conducted on the day of the accident; see section 1.3.1. The instructor therefore had no possibility of intervening in the situation that arose. This factor is discussed further in section 2.5.

2.3 Suitable vehicle and safety equipment

2.3.1 Choice of training vehicle

A Suzuki SFV650A is a heavy motorcycle that is relatively easy to handle, and it is frequently used for training purposes. The seat height of the motorcycle is relatively low, which means that most learners will be able to sit comfortably while also being able to reach the ground with both feet. Its high torque means that the motorcycle accelerates fairly rapidly at low rpm levels.

Based on its low centre of gravity and low height, the NSIA considers the motorcycle to be generally suitable for training purposes. However, the investigation has shown that it should be considered whether to use a light motorcycle (125cc) for introductory technical exercises during training for all inexperienced learners. Light motorcycles are easier to balance, which, combined with a lower engine output and acceleration, reduces the risk of losing control in the event of an accidental throttle input.

This is, inter alia, recommended in the State of Nevada's motorcycle manual. It is not included as a recommendation in the Driver Training Regulations or in Manual 850A 'Curriculum for driving licence category A'. The NSIA nonetheless believes it is something all driving schools should consider.

2.3.2 Choice of personal safety equipment

The curriculum for driving licence category A sets out requirements for learners' safety equipment during motorcycle training.

The NSIA considers that the equipment used by the learner in this case meets the minimum criteria for personal safety equipment when riding a motorcycle. However, the NSIA points out that other safety equipment is also available that provides even greater protection against crash injuries, including airbag vests and neck braces. An airbag vest is equipped with cartridges that inflate the vest in the event of a crash or impact, and that can protect the rider against internal injuries.

The NSIA believes that an airbag vest could have increased the chances of survival in this accident, as the learner died from internal injuries in the upper part of the torso. The

NSIA takes a positive view of driving schools offering learners the possibility of borrowing or renting airbag vests during motorcycle training.

2.4 Design and safety of training areas

It is important to provide safe training areas for learners who are to undergo introductory motorcycle training. Gjøvik Driver and Vehicle Licensing Office allows driving schools to use the training area for riding practice for learners with very limited experience of motorcycles.

The investigation has shown that the training area in question was not secured by physical barriers against the slope adjacent to the training area. Nor was any form of risk assessment carried out when the training area was established.

The investigation shows that there is a real risk of learners losing control of their vehicle during training and that barriers against the roadside terrain are important to safety. The NSIA considers it inadequate that the slope was not separated from the training area by railings or other physical barriers at the time of the accident.

Manual V621 (*MC-Sikkerhet*) discusses run-off-the-road motorcycle accidents as a separate topic, and presents proposals for measures that can be implemented to maintain traffic safety in connection with road design. The measures include improvement of the roadside terrain with using, e.g., sand embankments or railings with underrun protection for motorcycles.

The NSIA recognises the challenge associated with the use of metal or concrete railings, as they are static barriers that have the potential to inflict more damage/injury than they reduce. Padded barriers or other forms of flexible railings should therefore be considered as protective measures. A sand embankment or back-sloping roadside terrain can also be an option, but that would require more space. The investigation has shown that the NPRA has not implemented any measures relating to the design of the training area at Gjøvik Driver and Vehicle Licensing Office.

In light of this, the NSIA believes it would be expedient to establish requirements for risk assessments in connection with the design and use of the NPRA's training areas. This will ensure that due consideration is given to safety when conducting technical skill tests and when such areas are used by driving schools in connection with motorcycle training. By comparison, the NPRA has established dedicated manual requirements[8] for the safety of motorcycle riders in connection with road design.

The investigation has also shown that the applicable regulations do not require risk assessments or the implementation of safety measures in connection with the planning, design and use of training areas that are to be used for motorcycle riding tests.

The only current requirement states that the training area must be designed in accordance with the guidelines for administering driving tests[9] and Manual V850A 'Curriculum for driving licence category A'.

[8] Norwegian Public Roads Administration (2015). Håndbok V621 – *MC-Sikkerhet* (in Norwegian only)

[9] The Directorate of Public Roads may issue guidelines for the content and assessment of driving tests. The NPRA decides the locations where driving tests can be held. As a rule, candidates must pass both a theory and a practical tests for each driving licence category, cf. the Driver Training Regulations.

In the NSIA's view, the NPRA should introduce requirements that ensure that due consideration is given to road traffic safety in connection with the design and use of its training areas, and that should apply to both existing and planned training areas. Particular attention should be given to training areas that are available for use by driving schools for training. The requirements should include risk assessments of the design of training areas, as well as restrictions and the need to establish physical barriers and safety zones.

The investigation has also shown that the NPRA has not established an internal approval system for training areas with the focus on safety measures and giving due consideration to traffic safety. The NSIA believes that the NPRA should improve its internal control of training areas, including possible limitations on use.

The NSIA submits two safety recommendations on this point.

2.5 The Driver Training Regulations and the curriculum for driving licence category A

2.5.1 Introduction

This section assesses the Driver Training Regulations, the curriculum for driving licence category A and the driving school's training curriculum.

2.5.2 The Driver Training Regulations and the curriculum for driving licence category A

In accordance with Section 2-3 of the Driver Training Regulations, driving practice in training areas or other closed-off areas can be carried out with up to three learners per instructor for training for driving licence category A. The curriculum for driving licence category A[10] also states that each instructor may provide training to up to three learners in a training area in Step 2 of the training programme. This is justified by the possibility of experience transfer between learners during training.

In the NSIA's assessment, the safety of learners undergoing motorcycle training in a training area depends on the learners receiving close follow-up until they have reached a certain level of skill and experience. The need for follow-up is greatest when training novice learners, and the investigation shows that learners have different needs for training and learning.

It may therefore be expedient for the instructor to ride along with the learners on the motorcycle when practising basic technical skills, before the learners ride on their own in a closed-off area or training area. It may also be expedient to limit the number of learners per instructor in the initial training phase. The risk of undesirable incidents is related to many factors, and the investigation shows that such situations can be addressed through high awareness among the instructors and/or by possibly limiting the number of learners in the training area at the same time.

The Driver Training Regulations do not require all learners to be at the same skill and experience level. The NSIA believes that a situation in which learners at different skill levels practise at the same time on their own vehicles in a training area can be challenging from both a teaching perspective and in terms of safety. The NSIA will therefore also stress the importance of complying with the requirement in the curriculum

[10] Norwegian Public Roads Administration (2014). Manual V850A 'Curriculum for driving licence category A'.

that training shall be adapted to the learners' skill level, following an individual assessment.

One barrier that could potentially have prevented the accident is the use of a remote kill switch by the instructor. The NSIA is aware that industry organisations have contacted the Ministry of Transport about the possibility of introducing a requirement for remote kill switches during training in training areas. The NSIA is aware of the NPRA's follow-up of this enquiry, which shows that such a device could entail several technical challenges.

The NSIA takes a positive view of efforts to develop a remote kill switch, but, since the proposal has already been submitted to the authorities, the NSIA chooses not to submit any recommendations on this point.

2.5.3 The driving school's training curriculum

The learner was completing the second double lesson when the accidental throttle input occurred. The instructor had been in physical contact with the motorcycle during the first lesson, but considered that the learner was sufficiently skilled to drive on their own. The investigation has shown that the training curriculum meets the requirements set out in the Driver Training Regulations and Manual V850A 'Curriculum for driving licence category A'.

After the accident, the driving school introduced a practice whereby inexperienced learners, regardless of age, are required to take their initial training on a light motorcycle before possibly continuing on a heavy motorcycle.

The NSIA supports this measure, especially seen in light of the fact that neither the Driver Training Regulations, Manual V850A nor Manual V621 contain corresponding requirements or guidelines.

2.6 Learning from incidents and accidents that occur during training

The investigation has shown that there is no uniform system in the driving school industry for reporting undesirable incidents and accidents that occur in connection with training. The industry consists of many small entities (driving schools etc.), spread across the country, and information about incidents is not shared with others than those they concern to any great extent. This is an obstacle to experience transfer and the industry's possibility of learning from incidents and accidents that occur during training.

In the NSIA's view, the NPRA, as owner of the training areas and a key player in road traffic safety work, should take the initiative to establish a joint reporting system for driving schools to report incidents and accidents that occur during training. This work could also be carried out in cooperation with other operators involved in the training system.

The NSIA submits one safety recommendation on this point.

3. CONCLUSION

3.1 Operational and technical factors

a) The learner had no experience of riding a motorcycle and was undergoing the second practical lesson in a heavy motorcycle training programme.

b) The learner was practising turning techniques in the training area at Gjøvik Driver and Vehicle Licensing Office.

c) The learner experienced an accidental throttle input and lost control of the motorcycle.

d) The motorcycle, a Suzuki SFV650A, is frequently used for training purposes. It is a heavy motorcycle that is relatively easy to handle. It has a high torque, however, which means that it accelerates fairly rapidly at low rpm levels.

e) The learner rode out of the training area, and crashed into the wall of an industrial building at the end of a slope adjacent to the training area.

f) The learner died instantly in the crash.

g) The learner was wearing approved safety equipment. The learner was not using available safety equipment such as an airbag vest or neck brace that provide even greater protection against crash injuries.

h) The difference in elevation between the edge of the tarmac in the training area down to the lower edge of the industrial building was approximately 3.4 metres, over a distance of approximately 10 metres. The slope contained mixed vegetation and sharp gravel.

i) There was no railing or other form of physical barrier in the training area that could prevent a motorcycle from driving into the terrain.

j) The instructor was responsible for three learners in total, two of whom were undergoing training on heavy motorcycles, but at different skill levels. The third learner was taking a refresher lesson before the riding test for light motorcycles.

k) The instructor did not use a remote kill switch or communication equipment during the training. The learner was alone on the motorcycle, which meant there was no possibility of intervening in the situation that arose.

3.2 Underlying factors

l) The NPRA has not established a requirement for risk assessments in connection with the design and use of its own training areas, to ensure that due consideration is given to the safety of learners when conducting technical skill tests and training by driving schools.

m) The NPRA’s quality system does not include an internal approval procedure for training areas with the focus on safety measures and giving due consideration to safety.

n) The driving school's training curriculum met the requirements set out in both the Driver Training Regulations and Manual V850A 'Curriculum for driving licence category A'.

o) The Driver Training Regulations and Manual V850A permit training on a training track or in a closed-off area with up to three learners per instructor, regardless of the learners' skill level. This is justified by the possibility of experience transfer between learners during training.

p) Neither the Driver Training Regulations nor Manual 850A make it a requirement that inexperienced learners use a light motorcycle (125cc) for introductory technical exercises during motorcycle training. The driving school has introduced this as a measure after the accident.

q) No joint reporting system has been established for the driving school industry to enable experience transfer and the possibility of learning from incidents and accidents that occur during driver training.

4. SAFETY RECOMMENDATIONS

The investigation of this road traffic accident has identified several areas in which the Norwegian Safety Investigation Authority deems it necessary to submit safety recommendations for the purpose of improving road safety.[11]

Safety recommendation ROAD No 2021/08T

The investigation of the motorcycle accident at Gjøvik Driver and Vehicle Licensing Office on 10 July 2020 has shown that the training area had no railings or other form of physical barrier that could have prevented or reduced the extent of the damage/injury in the event of a motorcycle driving into the terrain. There is no requirement for a risk assessment when establishing the Norwegian Public Roads Administration's training areas, over and above the general requirements described in the guidelines for administering driving tests.

The Norwegian Safety Investigation Authority recommends that the Norwegian Public Roads Administration establish safety requirements that include risk assessments in connection with designing and using both existing and new training areas for practical riding tests for motorcycles.

Safety recommendation ROAD No 2021/09T

The investigation of the motorcycle accident at Gjøvik Driver and Vehicle Licensing Office on 10 July 2020 has shown that the training area had no railings or other form of barrier that could have prevented or reduced the extent of the damage/injury in the event of a motorcycle driving into the terrain. The Norwegian Public Roads Administration does not systematically follow up safety in connection with the design, alteration or use of its own training areas.

The Norwegian Safety Investigation Authority recommends that the Norwegian Public Roads Administration improve its internal control of its own training areas in order to quality assure safe design and use.

Safety recommendation ROAD No 2021/10T

The investigation of the motorcycle accident at Gjøvik Driver and Vehicle Licensing Office on 10 July 2020 has shown that there is no system in the driving school industry for reporting undesirable incidents and accidents that occur in connection with training. The driving school industry consists of many small entities (driving schools etc.), spread across the country, and a reporting system could help to achieve more learning and experience transfer between them.

The Norwegian Safety Investigation Authority recommends that the Norwegian Driving Schools Association (ATL) and Trafikkforum, in cooperation with the Norwegian Public Roads Administration, establish a joint reporting system for the driving school industry, to ensure that incidents and accidents that occur in connection with driver training are registered and evaluated.

[11] The investigation report is submitted to the Ministry of Transport, which will take the necessary steps to ensure that due consideration is given to the safety recommendations, cf. the Regulations of 30 June 2005 on Public Investigation and Notification of Traffic Accidents etc. Section 14.

The Norwegian Safety Investigation Authority

Lillestrøm, 29 June 2021

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