

INVESTIGATION REPORT

On the railway accident occurred by the running –off of the locomotive DHC 624 of the railway station ODORHEI on the non-interoperable running section ODORHEI-VÎNĂTORI, belonging to SC. RC-CF TRANS S.R.L. BRAȘOV at February 5, 2008



Final report

16 September 2008

1. SUMMARY

1.1. Short description of the railway event

- 1.1.1. On February 2, 2008 the diesel-hydraulic locomotive of 1250 horse power DHC 624 belonging to SNTFC „CFR CĂLĂTORI” S.A - Braşov Depot, rented by SC REGIOTRANS S.R.L Braşov, was performing shunting operations to the railway station ODORHEI, with on-board and the operating staff belonging to S.C. RC-CF TRANS S.R.L. Braşov.
- 1.1.2. According to the established shunting plan, the isolated locomotive DHC 624 must have been going to the end of the Y Odorhei railway station from the third busy line and moving to the fourth available line to the end of the X railway station and accessing again the third busy line with a view to couple the first wagon of a group of eight wagons that were located on this line and his shunting on the industrial track belonging to SC FAMOS SA Odorheiu Secuiesc.
- 1.1.3. After the locomotive entered on the fourth available track in order to move from the end of Y to the end of X of the railway station, the shunter went to the railway station building to ask the warehousewoman on duty, belonging to SNTFM „CFR Marfa ” to contact the representative of SC FAMOS SA Odorheiu Secuiesc with a view to open the access door, the foreman shunter going to the end of X of the railway station around the platform of the first track in order to perform the shunting operation.
- 1.1.4. The last shunting operation of the isolated locomotive DHC 624 controled by the driver was performed on 118 metres by increasing the speed from 0 kilometres/hour to 28 kilometres/hour on the time period 10:56:46 - 10:57:14 (28 seconds) and after the entrance on the fourth available line it has stopped at approximately 30 metres after safety allowance, in the same transversal position with the driver's cab of the class X diesel multiple unit parked at line no.2 the end of Y.
- 1.1.5. After the isolated locomotive DHC 624 stopped on the available line no.4, for unknown reasons, the driver left the locomotive, contrary to the regulation, descending from the driver's cab without stopping the diesel engine, switching to „0 ” the control switchgroup and the reversing gear, ensuring the locomotive against starting by a proper application of the handbrake and direct brake and without informing the foreman shunter (service official of the Odorhei railway station) in order to stay in the driver's cab.
- 1.1.6. On the occasion of the verifications performed on February 6, 2008 to Odorhei railway station, after the railway event took place, it was established that on the conditions of stopping the diesel engine according to the instructions, of switching to „0 ” the control switchgroup and the reversing gear, of a proper application of the handbrake and additional brake, the locomotive DHC 624 could not have been set into motion.
- 1.1.7. By questioning the railway staff resulted that on February 5, 2008, when performing his duty, the driver didn't informed anyone with respect to his health condition or reported problems of the locomotive functioning, reasons that would have justified, according to the provisions of article no.199 of the Instructions no. 201/2007, his descending from the locomotive.
- 1.1.8. On the occasion of the tests performed when reconstructing, resulted that before stopping at 10:57:14 (line no.4, end of Y, Odorhei railway station), the control switchgroup operation was turn from the superior steps to first step and not on „0” position, without operating the handle of the reversing gear to "0".
The locomotive stop was performed by braking (direct brake) with FD 1 valve of the B control cabin of the locomotive by moving the brake handle to the end (full braking) and the pressure of 3,7 bar being achieved in the brake cylinders, after which the brake handle was moved into an intermediary position, aproximately half of the stroke length and a fast reduction of the pressure was achieved from 3,7 bar to 1 bar followed by a slow reduction from 1 bar to 0,5 bar.
- 1.1.9. **During the shunting operations without specifying exactly the time, the driver carried out**

constructive modifications to the locomotive with the help of an improvised split pin by mechanical locking in „ open position” of the operating lever of the air release valve of the locomotive brake cylinders, this leading to the annulment of the locomotive braking effect when using the automatic brake and when the safety , vigilance and control installations began to function, contrary to the regulations of article 12, line 1, point j of Instructions for the operating staff activity in the railway transport no. 201/2007.

- 1.1.10. This situation was noticed by the driver who stopped the locomotive DHC 624 and also by the investigating commissions who were present to the place of the accident.
- 1.1.11. At 10:57:44, after stopping for 30 seconds, on the conditions mentioned above (diesel engine in function, loosening of the handbrake, the control switchgroup set on first step, the inversing gear in position „ forward” , the handle of the direct brake valve in position „ intermediary ” (corresponding to an air pressure in the brake cylinders of 0,4 – 0,5 bar), the locomotive set in motion to the end of X of the railway station , the speed increasing from 0 to 17 kilometres/hour on 47 metres for 17 seconds and having the exit distance of the line no.4 performed for shunting operation at line no.3 . In this conditions the locomotive run over 32.030 kilometres (with a medium speed of 28.4 kilometres) and has been stopped at 1+293 kilometre, between Săcuieni Noi Halt and Vânători railway station, respectively at a distance of 1.527 kilometres from Săcuieni Noi Halt at 12:06:10 hours.
- 1.1.12. The shunter located to the end of Y railway station, after he asked the warehousewoman on duty , belonging to SNTFM „ CFR Marfa ” to contact the representative of SC FAMOS SA Odorheiu Secuiesc with a view to open the access door and when he was leaving the building of the railway station and was heading to the end of X railway station in order to perform the shunting operation in that area, he saw the locomotive DHC 624 driver running after the locomotive DHC 624 that was set in motion and screaming : „ The locomotive is out of control!!!!” . Also, the train master, employee of the SC REGIOTRANS SRL Brasov, being on duty in that moment on the passenger train no.14843 and located in the railway station on the platform between lines 1 and 2 , saw the driver running after the locomotive and screaming : ” Somebody stop it!!!!”
- 1.1.13. The shunter of the end of X communicated to the foreman shunter (service official of the Odorhei railway station) the fact that the isolated locomotive DHC 624 set into motion towards the end of the X railway station, without the driver and the driver run to catch up the locomotive but he didn't succeeded , the locomotive running on the current line between Odorhei railway station and the Cristur halt.
- 1.1.14. At the time that the locomotive lost control, to the end of Y of direct line no.2 , the diesel multiple unit series X4500 no.4528– without passengers- , belonging to the railway undertaking SC REGIOTRANS SRL Brasov was parked having the engine turned off . He was going to circulate under the no.14843 with departure from the Odorhei railway station to Cristur halt at 11:30 hours, having the train-staff composed of the driver and the train master, both employees of SC REGIOTRANS SRL Braşov.
- 1.1.15. Taking in consideration this conditions, the service official from the Odorhei railway station ordered to the diesel multiple unit driver to turn on the diesel multiple unit no.4528 and together with the conductor and the shunter of the shunting team which was located to the end of X of the railway station to run the diesel multiple unit in order to follow the locomotive and to catch the locomotive that get lost from the Odorhei railway station and to give the necessary acoustic signals in the area of level crossings on which the lost locomotive was going to run.
- 1.1.16. At 11:12, between Odorhei railway station and Feliceni halt, at a distance of approximately 200 metres from Feliceni halt (located at a distance of 6.5 kilometres from the place of unauthorised putting into motion of the isolated locomotive DHC 624), the driver of the diesel multiple unit no.4528, together with the train master and the shunter noticed the driver of the lost locomotive running on the track bed from the area of the level crossing to the route from which the locomotive was arriving. The displacement of the driver from the locomotive DHC 624 to this place was performed by car, probably

a taxi that was stopping in front of the Odorhei railway station. The car and the car driver could not have been identified.

- 1.1.17. When the driver of the locomotive DHC 624 reached the lost locomotive at 29+150 kilometre, tried to catch the supporting bar to the access scale on the platform of the locomotive small bonnet (the locomotive was running with a speed of 24 kilometres/hour having the small bonnet in front), but he didn't succeed to mount the scale, he slid being hit by the right part of the locomotive, fact that led to driver fall under the locomotive wheels, amputation of the legs and finally to his death.
- 1.1.18. According to the medical certificate no.18 of February 6, 2008 that is attesting the death, issued by the Legal Consulting Room of Odorheiu Secuiesc, the causes of the death were established as follows:
 - a. The main cause : bleeding shock ;
 - b. Previous causes : internal and external bleeding ;
 - c. The initial morbid condition: multiple thoracic - abdominal traumatism .
- 1.1.19. The diesel multiple unit no.4528 was stopped to the place of the accident, the shunter descending from the diesel multiple unit, removing the victim from the line, communicating by phone with the service official of Odorhei railway station on the occurred facts and requesting him to inform the rescue means. The shunter stood with the victim until the medical personnel and other competent bodies arrived .
- 1.1.20. The service official of Odorhei railway station noticed the Railway Transport Police of Odorhei who informed the ambulance service. The ambulance car arrived in approximately 10-15 minutes and established the death , the public prosecutor arriving in 20-25 minutes.
- 1.1.21. The diesel multiple unit driver started again the diesel multiple unit and together with the train master that was in the control room of the locomotive followed the lost locomotive .
- 1.1.22. By trying to stop the isolated locomotive, the service official of Cristur halt performed an incoming track of the isolated locomotive DHC on the deflecting section no.4 of Cristur halt and put on the two rails all the eight drag shoes of the halt endowment and also the three concrete sleepers (some passengers that were in the halt helped him), then closing the mechanical barrier of the end of X Cristur halt.
- 1.1.23. The isolated locomotive DHC 624 entered on the line no.4 of Cristur halt and struck the drag shoes with the track cleaners, throwing them out of the rail, the concrete sleepers being struck and thrown from the track gauge with the protection shield .
Because the locomotive couldn't have been stopped, it passed through the Cristur halt at 11 hour, 53 minutes with a speed of 30 kilometres/hour and passed on the current line between Cristur halt and Vânători railway station.
- 1.1.24. After the locomotive DHC 624 and the diesel multiple unit no.4528 passed through Sântămăria halt, the driver took the decision to get near to the locomotive DHC 624 and after the buffers closeness of the two vehicles, he observed that the speed of the lost locomotive is constant (approximately 28 kilometres/hour) and that the buffers of the two railway vehicles are not detaching, requested to the conductor to stay in the driver's cab in order to stop the diesel multiple unit after he was succeeding to pass from the diesel multiple unit to the isolated locomotive DHC 624.
- 1.1.25. In this conditions, the driver get out from the cabin and passed on the support situated over the diesel multiple unit buffer, jumping on the locomotive buffers, catching the frontal platform bar and then moving on the lateral cant and entered into the locomotive driver's cabin and stopped it at 12:06:10 hours, between Săcuienii Noi halt and Vânători railway station, at 1+323 kilometre, respectively at a distance of 1.527 kilometres from Săcuienii Noi halt.
- 1.1.26. After the driver passed on the locomotive DHC 624, the diesel multiple unit was stopped by the train master.

1.2. **The direct and immediate causes of the railway accident are :**

1.2.1. The abandon of the locomotive by the driver contrary to the provisions of article no.199 of Instructions for the operating staff activity in the railway transport no. 201/2007 by:

- Inadequate stop of the locomotive by the control switchgroup operation on level 1 not on position „0” and non-operation of the reversing gear from position ” forward” to position ”0” after a complete stop (the control switchgroup was found set on level 1 by the driver who stopped the locomotive DHC 624);
- The non-assurance of the driver against starting the locomotive while parking (he didn't applied the handbrake); at previous tests performed on conditions imposed by the locomotive operating instructions, recorded in the technical assesment report no.117 of February 7, 2008, the tightening-up of the handbrake ensured the locomotive stop until the tractive force will increase corresponding to the third level of the control switchgroup (including the third level);
- The diesel engine was not stopped;
- The foreman shunter (the service official in our case) was not informed on the locomotive abandon and the request of his presence in the cabin.

1.2.2. The non-compliance with the labour protection norms contrary to the provisions of article no.9, paragraph (1), item s) of the Instructions for the operating staff activity in the railway transport no.201/2007, respectively article no.20, item k, l, r of the own regulations and instructions of labour protection.

1.2.3. When the driver of the locomotive DHC 624 realized the consequences of his actions he desperately tried to stop the locomotive but this lead to his death.

1.3. **The underlying causes** that led to the railway accident:

1.3.1. The locking in „open” position of the operating lever of the air release valve from the brake cylinders with the help of an improvised split pin, this leading to the annulment of the locomotive braking effect when using the automatic brake within the emergency brake controled by the safety , vigilance and control installations .

1.3.2. The technical change of the air release valve from the brake cylinders of the locomotive of the A command post, determined by the replacement of the splint from the rotation axle of the lever (original construction) with an improvised split pin fact that led to the increase of the play to the rotation point and between the exterior shoulder of the case and the beak of the lever.

1.4. **The root causes** that led to the railway accident are connected with the regulation and application framework of the safety management system related to the traction activity that shows the following deficiencies:

1.4.1. Technical interventions to the release valve when operating or repairing were performed without having the approval of the constructor or of the designer, those leading to his locking with an improvised split pin. This non-conformity was not noticed and cleared with the occasion of obligatory inspections or of inspections on the operating activity.

1.4.2. In their own regulations they didn't stipulated corrective actions in case of unjustified taking out of service of the safety , vigilance and speed control installations in the shunting activity.

1.4.3. This wrong working system was not discovered and the shunting activity continued to be performed by making constructive changes to the air release valve from the brake cylinders fact that led to the annulment of the braking effect when the safety , vigilance and automatic speed control installations went into force.

- 1.4.4. The emergency brakes within the shunting activity were not mentioned and discussed (according to the own regulations) fact that didn't allowed to find out the wrong working systems concerning the functioning of the safety , vigilance and automatic speed control installations . The voluntary mechanical locking with the help of an improvised split pin in „open position” of the operating lever from the air release valve from the brake cylinders of the locomotive can be noticed on the record of the speed -indicator by marking the putting into operation of the punctual speed control device (INDUSI) without decreasing the speed curve to zero in case of the displacement of the isolated locomotive.
- 1.4.5. The safety and vigilance installation (DSV) available on the Locomotive DHC 624 is not being designed so that the punctual speed control device (IVMS) from the locomotive could allow a specific record from which it should result if this installation was taking out of service or if it was put into operation owing to non-handling.
- 1.5. **Recommendations:**
 - 1.5.1. To train again the operating staff on the conditions that is allowed to leave the locomotive when standstill and on the measures that must be taken by the driver in case without driver's assistant.
 - 1.5.2. To train again the operating staff on the labour protection norms concerning the interdiction of boarding a locomotive in motion.
 - 1.5.3. To train the operating staff on the consequences of permanent locking of the operating lever from the air release valve of the locomotive brake cylinders by using any method that does not correspond to the instructions.
 - 1.5.4. An urgent technical inspection of the air release valves from the brake cylinders from all the locomotives and the irregularities clearance in order to observe the execution of the project .
 - 1.5.5. To improve the safety management system by :
 - Regulations for tracking and solving all the nonconformities of the emergency brakings performed within the shunting activity;
 - Regulations in order to revise the staff errors in case of taking out of service in an unjustified way or of a voluntary locking not according to the instructions of the safety , vigilance and automatic speed control installations within the shunting activity ;
 - Tracking the wrong working systems in the shunting activity related to the safety , vigilance and automatic speed control installations that were taking out of service or improper voluntary locked by analysing and performing a mandatory examination of all recorded cases of putting into service of the vigilance device without decreasing the speed curve to zero in case of the displacement of the isolated locomotive;
 - Establishing through the job sheets the tasks concerning the transfer, reading and dealing with the speed –indicator records and also to revise the irregularities established on this occasion;
 - 1.5.6. To establish the opportuneness that the punctual speed control device (IVMS) installation can perform a specific record from which it should result if this installation was taking out of service or was put into service owing to the non-handling.
 - 1.5.7. To establish the opportuneness of constructive changes to the air release valves of the locomotive brake cylinders from all locomotives type DHC in order to stop the use of improvised systems by locking these valves in „open position”.

The final report shall be transmitted to all the licensed railway undertakings that are owing in their wagon stock locomotives type DHC and to the Romanian Railway Safety Authority.

The Romanian Railway Safety Authority shall observe the method of implementing these recommendations.

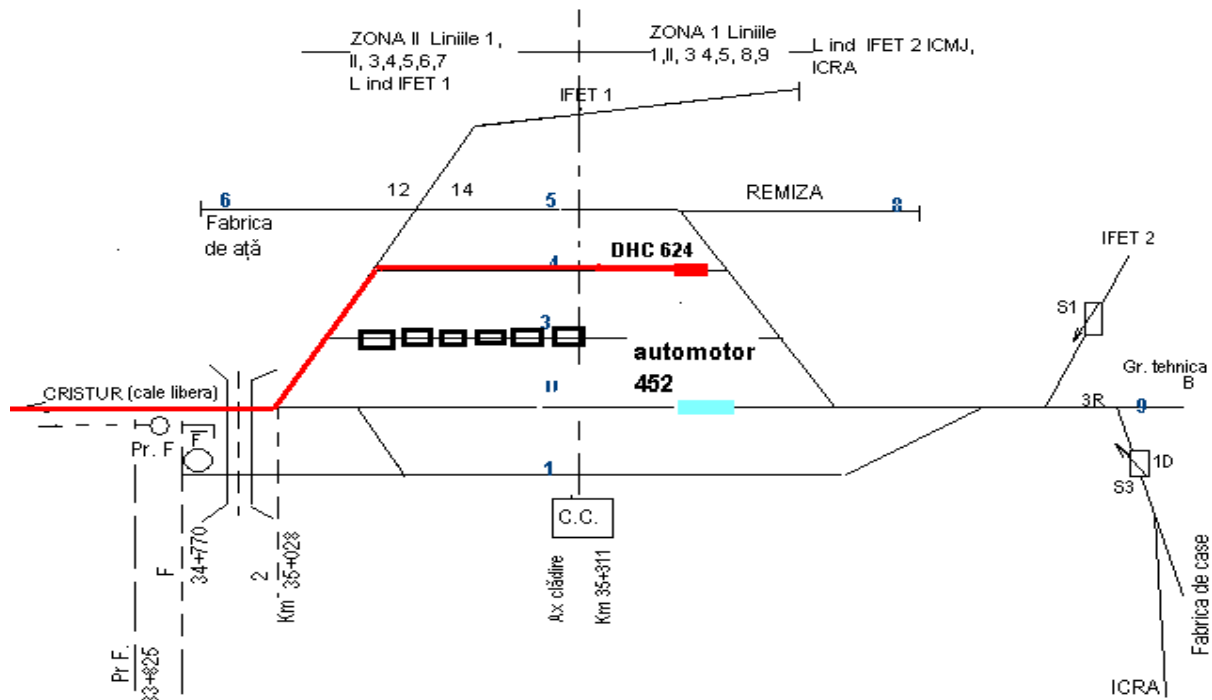
2. IMMEDIATE FACTS OF THE OCCURENCE

2.1. Description of the railway accident

- 2.1.2. On the basis of the testimonies of the involved personnel and of the interpretation of the speed-indicator records the railway accident has been reconstituted.
- 2.1.3. On February 5, 2008 the diesel-hydraulic locomotive of 1250 horse power DHC 624 belonging to SNTFC „CFR CĂLĂTORI” S.A - Braşov Depot, rented by SC REGIOTRANS S.R.L Braşov, was performing shunting operations to the railway station ODORHEI, with on-board and the operating staff belonging to S.C. RC-CF TRANS S.R.L. Braşov.
- 2.1.4. The railway station Odorhei is located on the non-interoperable running section Vânători – Odorhei , these running section being rented by SC RC-CF TRANS SRL Braşov in the capacity of administrator of the non-interoperable railway infrastructure.
- 2.1.5. On the running section Odorhei – Vânători (35. 513 kilometres) three section points are placed (Odorhei railway station – Cristur halt - Vânători railway station) and also a number of 10 halts opened to the passenger traffic without selling train tickets.
- 2.1.6. The trains traffic on the running section Vânători – Odorhei is carry out by using the system „ Centralized management of train movement” (the running of trains and the shunting operation are carried out on the basis of the traffic controller , being transmitted directly to the section points agents).
- 2.1.7. Odorhei railway station is equipped with safety installations with locks and block type SBW.



Running section Odorhei – Vânători



ODORHEI STATION

- 2.1.8. On February 5, 2008 between 07:12 – 10:57, to Odorhei railway station, according to the speed-indicator record (IVMS) the locomotive DHC 624 that was driven without driver's assistant, performed the shunting operation in order to compose the freight train no. 35821 with a view to be dispatched to Cristur halt. The shunting operation was performed by the service official of the railway station and two shunters.
- 2.1.9. At the same date, at 10:00 o'clock, the freight train no. 35822 arrived to the railway station Odorhei (the train belongs to the railway undertaking SNTFM „CFR Marfă” SA – Braşov Freight Branch) and was parked on the third deflecting section , the service official ordering to the shunting team to ensure the train with the drag shoe no. 12.
- 2.1.10. Before starting the shunting operation, the service official informed the driver and the two shunters on the shunting plan in order to shunt those 11 wagons that were brought by the train no. 35822, ordering on the operations that shall be performed and the conditions of performing these operations.
- 2.1.11. According to the established shunting plan, on the basis of the shunting signals , the following shunting operations were performed with the locomotive DHC 624 :
- A group of 7 wagons was detached from the freight train no.35822 and was hauled from the third line to the end of Y of the railway station , the train set being stopped after which the last wagon of the train set composition surpassed the area of the switch no.1 of the railway station;
 - After performing the route to the first deflecting line of the railway station by operating the non-interlocked points no.1, the group of the wagons was operated by backing movement to the first line;
 - The first three wagons (in the way of pushing a train) were detached from the group of the seven wagons and after their protection against running by one of the shunters , the wagons were left on the first deflecting track of the Odorhei railway station in order to be unloaded.
 - The other fourth wagons connected to the locomotive were hauled to the first line to the end of Y railway station , the train set being stopped after the last wagon of the train composition surpassed the area of the non-interlocked points no.1;
 - The train set composed of the fourth wagons was operated by backing movement to the third

busy line, the wagons being attached to the fourth wagons of the train composition no. 35822, that were left on the track .

- 2.1.12. Carrying on, according to the established shunting plan , the isolated locomotive DHC 624 was suppose to exit from the third busy line to the end of Y Odorhei railway station, to move to the fourth available line and to enter again on the third busy line in order to attach the first wagon of the group of the eight wagons located on the third line and his shunting on the industrial track that was belonging to SC FAMOS SA Odorheiu Secuiesc.
- 2.1.13. In this conditions, after detaching the locomotive DHC 624 on the basis of the signals given by the foreman shunter and by the shunter named by this, the driver set in motion the locomotive and exit from the third busy line to the end of Y railway station and after surpassing the switch no. 5 the driver stopped the locomotive.
- 2.1.14. The shunter operated the switch no.5 and after an examination of the position of the switch no.7 (this switch gives access to the fourth line), on the basis of the signals given by the foreman shunter and by the shunter , the driver set in motion the locomotive DHC 624, surpassed the area of the switches no.5 and no.7 and entered on the fourth available line in order to move to the end of X railway station.
- 2.1.15. According to the shunting plan, the operation of the non-interlocked points from the end of the X railway station in order to perform the exit of the locomotive DHC 624 from the fourth available line and entering on the third busy line in order to shunt the wagon that was going to enter on the SC FAMOS SA Odorheiu Secuiesc industrial track was performed by the other shunter.
- 2.1.16. After the locomotive DHC 624 entered on the fourth available line in order to move from the end of Y to the end of X railway station, the shunter located to the end of Y moved to the railway station building in order to ask to the warehousewoman on duty , belonging to SNTFM „CFR Marfa ” SA – Brasov Freight Branch to contact the representative of SC FAMOS SA Odorheiu Secuiesc with a view to open the access door in order to get in a wagon, the foreman shunter going to the end of X of the railway station around the platform of the first line in order to perform the shunting operation in this area.
- 2.1.17. The last shunting operation of the isolated locomotive DHC 624 was performed by the driver on a surface of 118 metres by increasing the speed from 0 kilometres/hour to 28 kilometres/hour on the time period 10:56:46 - 10:57:14 (28 seconds) and after its entrance on the fourth available line stopped at approximately 30 metres after the shunting limit signal, in the same transversal position with the diesel multiple unit driver's cabin from the end of Y parked to the second line.
- 2.1.18. After the stop of the isolated locomotive DHC 624 on the fourth available line, for unknown reasons, the driver left the locomotive, contrary to the regulation, descending from the driver's cab without turning off the diesel engine switching to „0 ” the control switchgroup and the reversing gear, ensuring the locomotive against starting, by a proper application of the handbrake and additional brake and without informing the foreman shunter (service official of the Odorhei railway station) in order to stay in the driver's cab.
- 2.1.19. On the occasion of the verifications performed on February 6, 2008 to Odorhei railway station, after the railway event took place, it was established that on the conditions of stopping the diesel engine according to the instructions, of switching to „0 ” the control switchgroup and the reversing gear, of a proper application of the handbrake and additional brake, the locomotive DHC 624 could not have been set into motion .
- 2.1.20. By questioning the railway staff resulted that on February 5, 2008, when performing his duty, the driver didn't informed anyone with respect to his health condition or reported problems of the locomotive functioning , reasons that could have justified, according to the provisions of article no.199 of the Instructions no. 201/2007, his descending from the locomotive.

2.1.21. On the occasion of the tests performed when recomposing, resulted that before stopping at 10:57:14 (ine no.4, end of Y Odorhei railway station), the control switchgroup operation was performed from the superior steps to first step and not on „0” position, without operating the handle of the reversing gear to „0”, the locomotive braking being performed with FD 1 valve (direct brake) of the B control cabin of the locomotive by moving the brake handle to the end (full braking) and the pressure of 3,7 bars being achieved in the brake cylinders, after which the brake handle was moved into an intermediary position, aproximatively half of the stroke length and a fast reduction of the pressure being achieved from 3,7 bars to 1 bar followed by a slow reduction from 1 bar to 0,5 bars.



The B control cabin of the locomotive DHC 624

2.1.22. During the shunting operations without specifying exactly the time the driver carried out constructive modifications to the locomotive with the help of an improvised split pin by mechanical locking in „ open position” of the operating lever of the air release valve of the locomotive brake cylinders, this leading to the annulment of the locomotive braking effect when using the automatic brake and when the safety , vigilance and control installations began to function, contrary to the regulations of article 12, line 1, point j of Instructions for the operating staff activity in the railway transport no. 201/2007.

2.1.23. This situation was noticed by driver who stopped the locomotive DHC 624 and also by the investigating commissions who were present to the place of the accident .



The release valve of the B control cabin, on normal position,unlocked and unchanged in a constructive way



The improvised split pin found to the place of the railway event

The release valve of the A control cabin, modified in a constructive way, locked in „open position” with the improvised splint pin found to the place of the railway event

- 2.1.24. At 10:57:44, after stopping for 30 seconds, on the conditions mentioned above (diesel engine in function, loosening of the handbrake, the control switchgroup set on first step, brake handle inversing gear in position „ forward” , the handle of the direct brake valve in position „ intermediary ” (corresponding to an air pressure in the brake cylinders of 0,4 – 0,5 bars), the locomotive set in motion to the end of X of the railway station , the speed increasing from 0 to 17 kilometres/hour on 47 metres for 17 seconds and having the exit distance of the line no.4 performed for shunting operation at line no.3 . In this conditions the locomotive run over 32.030 kilometres (with a medium speed of 28,4 kilometres/hour) and has been stopped at 1+293 kilometre, between Săcuienii Noi Halt and Vânători railway station, respectively at a distance of 1.527 kilometres from Săcuienii Noi Halt at 12:06:10 hour. This situation resulted from the tests performed after the railway event, related to the reading and interpretation of the speed recording tape.
- 2.1.25. The shunter located to the end of Y railway station, after asking the warehousewoman on duty , belonging to SNTFM „CFR Marfa” SA – Brasov Branch to contact the representative of SC FAMOS SA Odorheiu Secuiesc with a view to open the access door and when he was leaving the railway station building and was heading to the end of X railway station in order to perform the shunting operation in that area, he saw the locomotive DHC 624 driver running after the locomotive DHC 624 that was set in motion and screaming : „ The locomotive is out of control!!!” . Also, the train master, employee of the SC REGIOTRANS SRL Brasov, being on duty in that moment on the passenger train no.14843 and located in the railway station on the platform between lines 1 and 2 , saw the driver running after the locomotive and screaming : ” Somebody stop it!!!”
- 2.1.26. The shunter of the end of X communicated to the foreman shunter (service official of the Odorhei railway station) the fact that the isolated locomotive DHC 624 set into motion towards the end of the X railway station, without the driver and the driver run to catch up the locomotive but he didn't succeeded, the locomotive running on the current line between Odorhei railway station and the Cristur halt.
- 2.1.27. The diesel multiple unit series X4500 no. 4528 – without passengers-, belonging to the railway undertaking SC REGIOTRANS SRL Brasov, was parked having the engine turned off to the end of Y of direct line no.2 . He was going to circulate under the no.14843 with departure from the Odorhei

railway station to Cristur halt at 11:30 hours, having the train-staff composed of the driver and the train master, both employees of SC REGIOTRANS SRL Braşov.

- 2.1.28. Taking in consideration this conditions, the seervice official from the Odorhei railway station ordered to the diesel multiple unit driver to turn on the diesel multiple unit no.4528 and together with the train master and the shunter of the shunting team which was located to the end of X railway station to run the diesel multiple unit in order to follow the locomotive and to cath the locomotive that get lost from the Odorhei railway station and to give the necessary acoustic signals in the area of level crossings on which the lost locomotive was going to run.
- 2.1.29. At 11:12 hours, between Odorhei railway station and Feliceni halt, at a distance of approximately 200 metres from Feliceni halt (located at a distance of 6.5 kilometres from the place of unauthorised putting into motion of the isolated locomotive DHC 624), the driver of the diesel multiple unit no.4528 together with the train master and the shunter noticed the driver of the lost locomotive running on the track bed from the area of the level crossing to the route from which the locomotive was arriving. The displacement of the driver from the locomotive DHC 624 to this place was performed by car, probably a taxi that was stopping in front of the Odorhei railway station. The car and the car driver could not have been identified.
- 2.1.30. When the driver of the locomotive DHC 624 reached the lost locomotive at 29+150 kilometre, tried to cath the supporting bar to the acces scale on the platform of the locomotive small bonnet (the locomotive was running with a speed of 24 kilometres/hour having the small bonnet in front), but he didn't succeeded to mount the scale, he slid being hit by the right part of the locomotive, fact that led to driver fall under the locomotive wheels, amputation of the legs and finally to his death.
- 2.1.31. According to the medical certificate no.18 of February 6, 2008 that is attesting the death, issued by the Legal Consulting Room of Odorheiu Secuiesc, the causes of the death were established as follows:
- a. The main cause : bleeding shock ;
 - b. Previous causes : internal and external bleeding ;
 - c. The initial morbid condition: multiple thoracic - abdominal traumatism.
- 2.1.32. The diesel multiple unit no.4528 was stopped to the place of the accident, the shunter descending from the diesel multiple unit, removing the victim from the line, communicating by phone with the service official of Odorhei railway station on the occurred facts and requesting him to inform the rescue means. The shunter stood with the victim until the medical personnel and other competent bodies arrived .
- 2.1.33. The service official of Odorhei railway station noticed the Railway Transport Police of Odorhei who informed the ambulance service. The ambulance car arrived in aproximately 10-15 minutes and established the death , the public prosecutor arriving in 20-25 minutes.



The place where the driver suffered the accident

- 2.1.34. The diesel multiple unit driver started again the diesel multiple unit and together with the train master that was in the control room of the locomotive followed the lost locomotive .
- 2.1.35. Around 11:30 hours the service official of Odorhei railway station informs the service official of Cristur railway station on the locomotive DHC 624 lost in order to take measures of stopping it.
- 2.1.36. By trying to stop the isolated locomotive, the service official of Cristur halt performed on incoming track of the isolated locomotive DHC on the deflecting track no.4 of Cristur halt and put on the two rails all the eight drag shoes of the halt endowment and also the three concrete sleepers (some passengers that were in the halt helped him), then closing the mechanical barrier of the end of X Cristur halt.
- 2.1.37. The isolated locomotive DHC 624 entered on the line no.4 of Cristur halt and struck the drag shoes with the track cleaners, throwing them out of the rail, the concrete sleepers being struck and thrown from the track gauge with the protection shield .Because the locomotive couldn't have been stopped, it passed through the Cristur halt at 11 : 53 hours with a speed of 30 kilometres/hour and passed on the current line between Cristur halt and Vânători railway station.



- 2.1.38. Around 11:50 hours, the traffic controller of Brasov Traffic Control System, being on duty to „Valea Lungă” tried to find the position of the freight train no.35821 that it was supposed to arrive to CFR Vânători railway station but the service official didn't answer the phone , reason for which he called to Odorhei railway station and found out on the railway event informing also the locomotive running foreman of the control system.
- 2.1.39. Around 12:00 hours service official of Cristur halt answered the phone who informed him that the locomotive passed through the halt and is straightening to CFR Vânători railway station.
- 2.1.40. Around 11:50 hours, the chief of Brasov Traffic Control System was informed on the railway event by the manager of SC RC- CF TRANS SRL.
- 2.1.41. Taking into consideration that the position of the locomotive DHC 624 was not known, respectively the

distance to Vânători railway station of the lost locomotive, the chief of Brasov Traffic Control System within CNCF "CFR" SA – The branch of Brasov railway district went to the traffic controller's office that was controlling the railway traffic to „Valea Lungă” from which was ordered the performance of the journey for locomotive DHC 624 on the passing track from CFR Vânători railway station (by operating the switches 1R/ 3R), at 12:00 hours being ordered the stop of the trains movement between CFR Brasov railway station and Sighisoara railway station (main line no.300).

- 2.1.42. Establishing the fact that the isolated locomotive DHC 624 couldn't be stopped to Cristur halt, the driver and the train master continued to run diesel multiple unit in order to follow the locomotive DHC 624.
- 2.1.43. After the locomotive DHC 624 and the diesel multiple unit no.4528 passed through Sântămăria halt , the driver took the decision to get near to the locomotive DHC 624 and after the buffers closeness of the two railway vehicles , he observed that the speed of the lost locomotive is constant (approximately 28 kilometres/hour) and that the buffers of the two railway vehicles are not detaching , requested to the train master to stay in the driver's cab in order to stop the diesel multiple unit after he was succeeding to pass from the diesel multiple unit to the isolated locomotive DHC 624.
- 2.1.44. In this conditions, the driver get out from the cabin and passed on the support situated over the diesel multiple unit buffer, jumping on the locomotive buffers, catching the frontal platform bar and then moving on the lateral cant and entered into the locomotive driver's cabin and stopped it at 12:06:10 hours, between Săcuienii Noi halt and Vânători railway station, at 1+323 kilometre, respectively at a distance of 1527 kilometres from Săcuienii Noi halt.
- 2.1.45. After the driver climbed the locomotive DHC 624, the diesel multiple unit was stopped by the train master. We are specifying the fact that the train master had authorization in order to handle the traffic safety devices with whom the locomotives are equipped in order to keep them on the spot when shunting and/or to trains movement in case without driver's assistant.
- 2.1.46. The isolated locomotive DHC 624 ran from Odorhei railway station until approaching to Vânători railway station on 32.03 kilometres with speeds of 27-33 kilometres/hour. Maintaining the speed within this interval was supported by the sinous route of the track and by the longitudinal profile of it (the maximum ruling down –gradient on the running section Vinatori – Odorhei being of 13,1‰).
- 2.1.47. After the stop of the lost locomotive DHC 624 and its attaching to the diesel multiple unit no.4528, they were parked at 12:25 hours to Cristur halt and at 12:29 hours the control system RC- CF TRANS Brasov approved this in written.
- 2.1.48. Reopening of the running section Brasov-Sighisoara to the railway traffic was ordered at 12:30 hours.
- 2.1.49. As conclusion, the lost locomotive should have stopped by itself as result of the safety and vigilance device operation when surpassing the speed of 10 kilometres-hour and nonoperating the safety control pedal b 13/1.2. This did not happened because of the mechanical locking (with help of an improvised splint pin) in position „open” of the operating lever from the air release valve from the brake cylinders of the locomotive.
- 2.1.50. On the previous tests performed on regular conditions of operating a locomotive, tests that are mentioned in the tehcnical report no. 117 of February 2, 2008 the safety and the vigilance device ordered the emergency braking and uncoupling the hydraulic transmission on the conditions that this device was tested when the driver don't step on the pedal.
- 2.1.51. The uncontrolled setting into motion and the previous movement of the locomotive were caused by the non-observance of the legal provisions on the locomotive devices handling as showed to the previous items and because of the track profile (the ruling down –gradient of line no.4 from CFR Odorhei railway station is 2 ‰,, the longitudinal profile of it being sinous and having a predominant down-grade).
- 2.1.52. According to the provisions of article no.19 of Law no.55-2006 was set up the Romanian Railway

Investigating Body, a permanent and independent body within the Romanian Railway Authority – AFER, that is performing an investigation of the serious railway events in the railway field, his objective being to improve the railway safety and to prevent the railway events. The Romanian Railway Investigating Body can investigate also those railway events and incidents that on different conditions could have led to serious railway events, including technical defects of the structural subsystems or of the interoperability constituents of high speed or European conventional railway systems.

- 2.1.53. According to the provisions of article no.3, item "m" of Law no. 55/2006 on the railway safety, this railway event meaning the lost of the locomotive DHC 624 of CFR Odorhei railway station followed by the death of the driver represents a serious railway accident.
- 2.1.54. Taking into consideration that on February 5, 2008 took place a serious railway accident, the lost of the locomotive DHC 624 of CFR Odorhei railway station followed by the death of the driver, the Romanian Railway Investigating Body decided to perform an investigation of this railway event the investigating commission being composed of:
- i. OLARU Mihai - investigator in charge
 - ii. CIOBANU Eugeniu - investigator
 - iii. DRĂGHICI Marin - investigator
- 2.1.55. The object of the investigating activity is not to establish the guilt or the responsibility and is developed simultaneous with other investigating activities, including those performed by the responsible authorities for the judicial investigation.
- 2.1.56. The investigation is performed in a open manner so all the parts can be listen and can have access to the results. The railway infrastructure manager and the involved railway undertakings, the Romanian Railway Safety Authority, the victims and their relatives, the owners of the deteriorated goods, the manufacturers, the involved emergency services and the personnel representatives and the users are informed periodically on the investigation and its course and granting the possibility that they express their opinions on the investigation and having the possibility, at their request, to make comments on the informations from the reports projects.

2.2. The background to the occurrence:

- 2.2.1. The personnel involved in the railway accident belongs to S.C. RC-CF TRANS SRL Braşov (the dead driver, first shunter, second shunter, the service officials of Odorhei and Cristur railway stations, the instructor, the person responsible with the railway traffic safety management), respectively S.C. REGIOTRANS SRL Braşov (the driver and the train master of the diesel multiple unit).
- 2.2.2. The activity on the running section Vînători – Odorhei is performed by the personnel belonging to S.C. RC-CF TRANS SRL Braşov, S.C. REGIOTRANS SRL Braşov and CNCF CFR SA – The control system of Braşov, on the basis of the joint venture agreement no. 560 / 280 of 2006 closed between S.C. RC-CF TRANS SRL Braşov and S.C. REGIOTRANS SRL Braşov, of the Convention no.1179 / 639 of December the first, 2007 closed between S.C. RC-CF TRANS SRL Braşov and SC. REGIOTRANS SRL Braşov and also the Contract no. 5N/4 of June 30, 2006 closed between CNCF CFR SA and S.C. RC-CF TRANS SRL Braşov.
- 2.2.3. The involved locomotive was of type **DHC**, no. **624**, property of National Company of Romanian Railways C.F.R. Passengers"- S.A. rented according to Contract No. 10 / 2006 by SC KEOLIS SRL, becamed S.C. REGIOTRANS SRL Braşov.
- 2.2.4. The involved railway infrastructure, respectively the running section Odorhei- Vînători that is being managed by S.C. RC-CF TRANS SRL Braşov, has a single running track, standard gauge with superstructure type 49, concrete sleepers with sinous profile and a predominant down-grade on Odorhei- Vînători. The trains traffic on the running section Vînători – Odorhei is carry out by using the system „Centralized management of train movement” (the running of trains and the shunting operation

are carried out on the basis of the traffic controller, being transmitted directly to the section points agents).

- 2.2.5. The rescue public services emergency plan was released by the first shunter that called the service official of Odorhei railway station using his own mobile phone, the service official informed the police, who informed the ambulance service, intervention being performed in 10-15 minutes (ambulance service) respectively 20-25 minutes (police and public prosecutor).

2.3 Fatalities, injuries and material damage:

- 2.3.1. **Victims and injured persons:** As result of the railway event was registered the death of the driver of the locomotive DHC 624 according to the medical certificate no.18 /2008 of the Miercurea Ciuc Hospital, the Legal Consulting Room of Odorheiu Secuiesc, Harghita District.

2.3.2. Material damages :

Concerning the rolling stock,passengers, freight	- it were not
Concerning the tracks and devices	- it were not
Concerning the environment	- it were not

2.4 External circumstances:

- 2.4.1. On February 5, 2008, on the time period 10:00 - 13:00 visibility was very good, the temperature of 6 Celsius degrees, clear sky.

3. RECORD OF INVESTIGATIONS AND INQUIRIES

3.1 The testimonies of the involved personnel

- 3.1.1. **The service official** being on duty to Odorhei railway station that had also the attributions of the foreman shunter, declared the following:

- The driver stopped the locomotive DHC 624 at line no.4 when moving from the end of Y to the end of X of the railway station in order to enter on line no.3 where was a group of wagons and didn't noticed when the driver descended from the locomotive, being located on the platform of line no.1 in front of the service official's office.
- He was not informed by the driver on the locomotive abandon;
- The moment of setting into motion and respectively the lost of the locomotive DHC 624 was communicated by others employees;
- He assumes the responsibility of the orders on the routing of the diesel multiple unit with the driver, the train master and a shunter supervising the locomotive;
- He informed the Chief of the Transports Police on the driver accident that took place near the Feliceni halt level crossing in order to call the ambulance service and the state penal investigating means, IDM of Cristur halt that around 11:30 hours the lost locomotive was running being followed by the diesel multiple unit and then to inform the Traffic Control System of Brasov on the lost locomotive.

- 3.1.2. **The service official** being on duty to Cristur halt declared the following :

- He performed a passing route of the train no. 35 821 which in that moment had to enter to the railway station ;
- He placed on the track on which the lost locomotive was going to pass, eight drag shoes and three concrete sleepers, being helped by three passengers in order to realize an obstacle, but this obstacle didn't succeed to stop or to significantly decrease the locomotive speed ;
- He closed the barrier before its arrival and opened it after the locomotive passed ;
- He informed the traffic controller that the locomotive occupied the running line Cristur – Vînători;

- He communicated with the driver who ensured him that he succeeded to stop the locomotive;
- He ordered the return of the diesel multiple unit no.4528 and of the locomotive DHC 624 to Cristur halt on the line no.4 of the railway station ;
- He transmitted around 12:10 hours the approval, written in the presence of the traffic controller, after parking in the railway station the fact that the running line Cristur – Vînători is available.

3.1.3. The driver of the diesel multiple unit no. 4528 declared the following:

- He was informed by service official and by train master that the locomotive DHC 624 escaped into the running line while he was in the diesel multiple unit no.4528 which was stopped on line 2;
- He receives the order from the service official of Odorhei railway station to run with the diesel multiple unit no.4528 after the locomotive DHC 624 together with the train master and the first shunter;
- He saw when the driver tried to climb the locomotive near to the Feliceni halt level crossing and also when he was injured ;
- After the accident he stopped the diesel multiple unit no.4528 and after he pulled out the victim (the shunter stood with him in order to ensure protection and to keep intact the place of the railway event) he continued together with the conductor to follow the locomotive;
- Close to Săcuienii Noi halt where the line is straight with a down-grade of 0,7‰ , the locomotive speed became stable at 28 kilometres/hour, succeeding to get near with the diesel multiple unit until the buffers contact and in this moment the diesel multiple unit driver comes out from the cabin and jumps from the diesel multiple unit buffers to the locomotive buffers, catching the frontal platform bar and then moving on the lateral cant and enters into the locomotive driver's cabin and stops it at 12 :06:10 hours, at a distance of 1527 kilometres from Săcuienii Noi halt;
- When he climbed the locomotive he found the control switchgroup set to position 1, the vigilance and safety device set to electric function, the air release valve from the brake cylinders was locked, the handbrake and the additional brake were released , he did not succeeding to refill the general pipe owing to the safety, vigilance and speed control systems ;
- On the re-entry distance from running line to Cristur halt, running by backing movement of the diesel multiple unit, the automatic brake was operated by the speed control device (INDUSI) having a track influence of 1000 Hz;
- He acted in order to avoid a possible catastrophe and sustains that he has done all to stop the accident.

3.1.4. The first shunter being on duty when the railway event took place to CFR Odorhei railway station, declared the following:

- He described the shunting operations performed before the railway event took place;
- He handled the switches from the end of Y of the railway station for the isolated exit of locomotive DHC 624 from the line no.3 and its entry on the line no.4 where it was supposed to wait in order to call the economic agent and to perform the next shunting operation;
- After he left the office of the freight agency, he noticed the locomotive that was set into motion and saw the driver running in order to catch it;
- He got an order and he left by diesel multiple unit in order to secure the level crossing;
- He noticed that in the area of the mile post 29, near to Feliceni halt level crossing, the driver tried to climb the scale and how he was injured and after the diesel multiple unit was stopped the victim was pulled , he informed the service official of Odorhei railway station on the railway event by phone, telling him to inform also the ambulance service and the state competent authorities;
- He stood with the injured driver, declared that the ambulance service arrived in 10-15 minutes from the moment he called the service official, the medical staff certifying the death of the victim, and waited the police and the prosecutor , those arriving after 5-10 minutes;

- By following the locomotive, on the board of the diesel multiple unit it was the driver, the train master and himself.

3.1.5. The diesel multiple unit train master declared that:

- When he was situated on the railway station platform, noticed the locomotive running on the line no.4, meanwhile its driver trying to catch it;
- He communicated immediately with the service official on what he noticed, this ordering through the transmitting station to the second shunter to ensure the two level crossings and then to handle the switches in order that the diesel multiple unit to exit from the line no.2.
- Being with the driver of locomotive and the first shunter they saw how the railway event took place;
- He went in the driver's cab and after the driver passed on LDH 624, he applied the brake and stopped the diesel engine ;
- He left the diesel multiple unit, gave signals of coupling and attached the diesel multiple unit to the lost locomotive, informed the service official of Cristur that the locomotive has stopped, receiving the order to return to Cristur halt, giving acoustic signals to the level crossings when returning; he was located in the front cabin to the direction of the diesel multiple unit.

3.1.6. The second shunter being on duty at Odorhei railway station declared the following:

- Being located to the end of X of the railway station (to Feliceni halt) he received orders to lock the barriers of the two level crossings when the locomotive lost control and to handle the switches in order to the a safe exit of the diesel multiple unit from the line no.2 .

3.1.7. The traffic controler being on duty to the Traffic Control System of Brasov, on "Valea Lungă" declared:

- Around 11:50 hours he tried to locate the train no.35821 that was supposed to arrive to CFR Vinători railway station but the service official of Cristur Halt didn't answered the phone, reason for which he called to Odorhei railway station and find out about the railway event, after which he informed the chief of the Control system of Brasov;
- Around 12:00 hours, the service official of Cristur Halt answered the phone informing him that the locomotive passed and it's straightening to Vinători railway station;
- He ordered to stop the trains on Vinători railway station on the running section with automatic block and to perform the route on the avoiding track of the locomotive DHC 624 that was supposed to arrive from Cristur halt.

3.1.8. The Chief of the District Traffic Control System of Brasov, declared :

- He was informed on the railway event by the management of SC RC- CF TRANS SRL around 11:50 hours and on the track of Valea Lungă examined if it were given the adequate orders for stopping the trains movement and if the route was performed on the avoiding track to Vinători railway station;
- He was informed on the fatal accident of the driver around 13:30 from the report of the labour accident.

3.1.9. The instructor that had as subordinate the injured driver for theoretical and practical training, declared :

- On the occasions of the performed inspections and practical trainings he didn't discovered a wrong working method, respectively the mechanical locking in position " open" of the lever of the air release valve from the brake cylinders;
- He couldn't offer a justification of the disgressions performed by the victim that led to the railway event.

3.1.10. The Chief of the Traffic Safety Department of SC RC- CF TRANS SRL that is in charge also with the railway safety management being on duty, declared :

- The provisions of the safety certificates type A and type B are fullfiled and applied ;

- He considers that the railway event took place owing to some human mistakes and fatigue and not owing to technical conditions or irregular activities that are to be charged to the company's management.

3.2 The safety management system:

From the analysis of the safety management system resulted that:

- 3.2.1. The locomotives used in the shunting activity are equipped with safety, vigilance and speed control devices and in the case of the locomotive involved to the railway event it functioned according to the factual reports ;
- 3.2.2. On the basis of the document no. 277.a of April 20, 2007 were drawn up and approved the Regulations on the activity of replacing, inspection, reading and dealing with the speed recording tapes to the locomotives and the diesel multiple unit of its own engine fleet and on the basis of the document no.277 b of April 20, 2007 were drawn up the Regulations when dealing with the braking cases caused by the operating staff.
- 3.2.3. Are not foreseen corrective measures in case of taking out of service in a abusively way of the safety, vigilance and speed control devices.
- 3.2.4. Technical interventions when operating or repairing were performed without having the approval of the constructor or of the projector to the release valve, allowing its locking with the help of an improvised splint pin.

3.3. Rules and regulations :

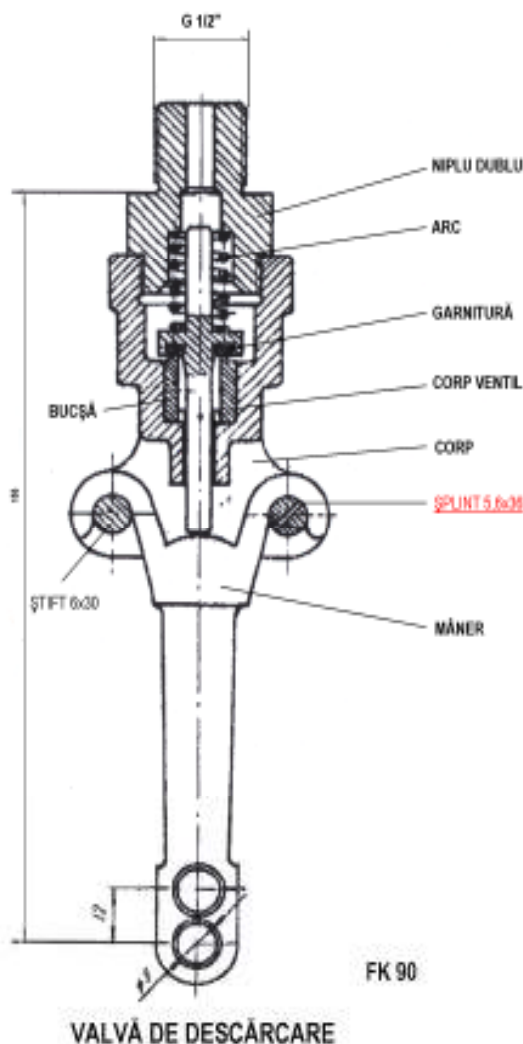
The driver of the locomotive DHC 624 when performing the shunting activity to Odorhei railway station didn't observed the following regulations this leading to the railway event:

- a) He left the isolated locomotive DHC 624 when performing the shunting activity to Odorhei railway station on February 5, 2008 without observing regulations in force, contrary to the provisions of article 12, paragraph (1), item e) of the *Instructions for the operating staff activity in the railway transport no.201/2007*;
- b) He left the locomotive DHC 624 when shunting , applying an easier system on February 5, 2008 to Odorhei railway station without turning off the diesel engine, ensuring the locomotive against starting and informing the foreman shunter to stay in the driver's cab in order to supervise it, contrary to the provisions of article no.199, paragraph (1) and paragraph (3) of the *Instructions for the operating staff activity in the railway transport no.201/2007*, to the provisions of article no.234, paragraph (1) and paragraph (2) of the *Railway Technical Operating Regulation no.002/2001* and to the provisions of chapter III, item no.3 of the Order no. 310/1/441/1993 of the Traction General Direction - „Regulations on the testing of the locomotive control operation“;
- c) During the shunting activity performed to Odorhei railway station on February 5, 2008 , without mentioning the precise time, the driver made constructive changes to the locomotive , meaning to the locomotive braking device, by mechanical locking in position „open“ of the operating lever of the air release valve from the locomotive brake cylinders, with help of an improvised splint pin, contrary to the provisions of article no.9, item j) of the *Instructions for the operating staff activity in the railway transport no. 201/2007*;
- d) He didn't informed the service official of Odorhei railway station on the lost of the isolated locomotive DHC 624 from the line no. 4 of Odorhei railway station , contrary to the provisions of article no.176, paragraph (2) of the *Instructions for the operating staff activity in the railway transport no.201/2007* and the provisions of article no.81, paragraph (2) of the *Regulation for the trains movement and the railway vehicles shunting no.005/2005*;
- e) He didn't observed and applied exactly the protection labour norms, contrary to the provisions of article no.9, paragraph (1), item s) of the *Instructions for the operating staff activity in the railway transport no.201/2007*;

3.4. Functioning of rolling stock and technical installations:

3.4.1. The primary inspection after the railway event took place was performed to the driver's cab of the locomotive DHC 624 , in order to be stopped by the diesel multiple unit driver who followed the lost locomotive and according to the declarations he found that:

- The access door to the driver's cab was closed(without being locked) ;
- The additional brake was released;
- The handbrake was released ;
- The valve of the automatic brake of the driver (KD 2) of the first control post was in the third position (isolated);
- The valve of the automatic brake of the driver (KD 2) of the second control post was in the second position (direction of traffic);
- The safety and vigilance equipment was put into function;
- The operating lever of the air release valve from the locomotive brake cylinders was mechanical locked in position „open” with the help of an improvised splint pin, fact that led to the annulment of the locomotive braking when using an automatic brake;
- The use of the splint pin for mechanical locking in position "open" of the operating lever of the air release valve from the locomotive brake cylinders of the A command post, determined by the replacement of the splint from the main pivot of the lever (original construction) with a screw fact that led to the increase of the play to the rotation point and between the exterior shoulder of the case and the beak of the lever.



The splint pin of the lever rotation point as original version that doesn't allow to insert an improvised splint pin



Screw that replaced the original splint pin from the rotation point of the lever and allows to insert the improvised splint pin

Improved splint pin

- The control switchgroup and the reversing gear were not operated to position '0', the control switchgroup being operated to step '1' and the reversing gear to position 'forward', fact that explains the reduced and almost constant speed of the locomotive displacement on the route between Odorhei railway station and the place where the locomotive was stopped, having a medium speed of 28,4 kilometres/hour.
3. 4. 2. The technical inspection of the locomotive DHC 624 was made by a commission on February 6, 2008 to Odorhei railway station.

On regular conditions of operating that are mentioned to the technical factual report no.117 of February 7, 2008 when performing the inspection of the safety and vigilance equipment on the conditions that the driver doesn't perform any operation on it, it was established that is performed the release of the general air pipe having as result the emergency braking and also the uncoupling of the locomotive hydraulic transmission.

From the technical inspection of the release valves resulted that:

- **To the release valve of the A command post, the original splint pin from the rotation point of the lever was replaced with a screw fact that led to the insertion of the improvised splint pin that locked in position « open » the operating lever of the release valve ;**
- **The release valve of the B command post is functioning in normal conditions, without a play in the rotation point, respectively between the exterior shoulder of the case and the beak of the lever and doesn't allow the locking in position „open” of the operating lever with help of improvised devices like splint pin.**

The locking in open position of the release valve operating lever annuls the braking effect when using the automatic brake by releasing the air from the brake cylinders that is controlled by the triple valve having the role of decreasing the air pressure from the general pipe and commands the air supplying of the brake cylinders corresponding to the brake step commanded by the cock KD2.

On this conditions, in case of the isolated locomotive running, takes place the annulment of the brake effect when using the automatic brake and also the taking out of service of the safety and vigilance equipment (DSV), respectively the speed control equipment (INDUSI).

It was not possible to determine when and where was replaced the original splint pin of the rotation point of the lever with a screw because of the records lack.

The last inspection of the locomotive DHC 624 was of type R1 and was performed on January 7, 2008 by SC KRON – TRIEM SRL Braşov.

After examining the inspection performance order it was noticed that the operating staff didn't ask for supplementary works, the staff performed the works according to the list of works NL-03-REV and at the end of the inspection the locomotive being tested by an examiner it was accepted by the beneficiary.

The order is accompanied by the conformity statement no .04/2008, having the AFER's endorsement no.501.

Also, tests were performed on the handbrake and additional brake functioning of the locomotive DHC 624 from which resulted the following:

- **Tests of the locomotive additional brake:**
- The locomotive set into motion, the control switchgroup being switched on position no.3 and after the control switchgroup was switched on position no. 1, the locomotive being stopped by direct

braking, then by a successive and gradual handling of the direct brake cock FD1 in order to loose the brake, it was noticed that at a pressure of 0,45- 0,5 atmosphere in the brake cylinders at approximately 20 seconds of handling the cock FD1 in order to loose the brake the locomotive set into motion.

○ **Tests of the locomotive handbrake :**

- After ensuring the locomotive against starting up by using the handbrake (18 rotations were performed in order to apply the brake) the control switchgroup was set to position no.1 and it was noticed that the locomotive didn't started ; the control switchgroup was set to position no.2 and no.3 and the locomotive still didn't started; when the control switchgroup was set on position no.4 the locomotive set into motion.
- After ensuring the locomotive against starting up by using the handbrake the control switchgroup was set to position no.1 in order to loose the handbrake. The locomotive set into motion after two rotations in order to loose the handbrake.

On regular conditions of stopping the diesel engine, of operating the control switchgroup to position "0" , of tightening the locomotive handbrake and direct brake, the locomotive didn't started;

The air compressor is functioning normally .

The air manometers are functioning but are not metrological examined.

The brake unit tightness is good.

3.4.3 The condition of the railway infrastructure, of the sigalling and communication system:

- Available lines: 5;
- Busy lines: 1,2,3, 4;
- Closed lines: are not;
- The signals conditions: good and regular visibility;
- The switches condition : good;
- The condition of the controlling signal boxes: good;
- The condition of the telecommunications devices: good.

3.5 . Documentation on the operating system

3.5.1 Measures taken for signalling and controlling the traffic

The uncontrolled setting into motion and the previous movement of the locomotive were caused by the non-observance of the legal provisions on the locomotive handling as showed to the previous items and because of the track profile (the ruling down –gradient of line no.4 from CFR Odorhei railway station is 2 ‰, the longitudinal profile of it being sinous and having a predominant down-grade).

In order to stop the locomotive DHC 624 that lost control on the running line , the service official of Odorhei railway station ordered around 11:00 hours the route performance for the diesel multiple unit no.4528 that was standing still at line no.2 (which was going to be dispatch as passenger train no.14843 at 11:30 hours) and its routing in order to follow the locomotive DHC 624.

The measure mentioned above, according to the service official's statement, was taken in order to stop the lost locomotive and to avoid the impact of the vehicles that could have been encountered to the level crossings. Between Odorhei railway station and Săcuienii Noi halt are about 29 level crossings from which only 6 are provided with barriers that are being handled by the train staff.

The service official of Odorhei railway station informed with delay the traffic controller of the Traffic Control System of Brasov on the lost of the locomotive DHC 624 , respectively on the death of the driver but he immediately informed the chief of the Railway Transport Police on the driver accident near the Feliceni halt in order to inform the ambulance service and the state penal investigating authorities. Also, he informed the service official of Cristur halt around 11:30 hours that the lost locomotive followed by the diesel multiple unit was running.

3.5.2. Measures taken to protect and safeguard the site of the occurrence

It can be registered the actions of the first shunter that:

- He noticed that in the area of the mile post 29, near to Feliceni halt level crossing, the driver tried to climb the scale and how he was injured and after the diesel multiple unit was stopped the victim was pulled, he informed the service official of Odorhei railway station on the railway event by phone, telling him to inform also the ambulance service;
- He stood with the injured driver, waited the ambulance service that arrived in 10-15 minutes from the moment he called the service official, the medical staff certifying the death of the victim, and waited the police and the prosecutor, those arriving after 5-10 minutes;

3.6. Man – machine – organization interface

3.6.1. The work program for the involved personnel was 8 hours (7:00—15:00 hours) – the driver and the shunting personnel (the two shunters) and for the service official and the traffic controllers the work program was 12 hours / 24 hours.

On February 5, 2008 the shunting activity began according to the records of speed recorder at 7:14 hours without interruptions until 10:57 hours when the railway event took place.

3.6.2. The medical and personal circumstances of the injured driver:

- According to the records he had the medical notice no. 5 of February 12, 2007 as „MEDICALLY ABLE FOR THE DRIVER POSITION” and psychological notice no.12 of February 14, 2007 as „PSYCHOLOGICAL ABLE FOR THE DRIVER POSITION”;
- The injured driver of 55 years old had a very good professional evolution within the engine shed of Sighisoara (he fulfilled his duty as driver for 25 years, he was certificated as „locomotive running foreman” in November 1991, he fulfilled his duty as locomotive examiner between 1993-2000, head driver starting from 2000 until September 2003 when he retires at his request from SNTFM „CFR MARFĂ” SA Depot of Braşov P.A.E. Sighişoara);
- Although the consequences of the irregular locking of the release valve are known works were performed within the current maintenance that allow from the technical point of view its locking; this deviation was not noticed and solved on the occasion of the mandatory technical inspections or on the occasion of the inspections of the activity.

3.7. Traffic interruptions

On February 5, 2008 the running section Braşov – Sighişoara was closed to the railway traffic starting with 11:55 hours until 12:30 hours, but no delays of the passenger trains were registered.

The railway traffic was not closed on the non-interoperable running section Vânători – Odorhei, the only train that was going to run in this time that the locomotive DHC 624 was lost being the passenger train no. 14843 that was supposed to run on the route Odorhei – Cristur and being composed of the electric train no.4528. On the route Odorhei – Cristur the passenger train no. 14843 was cancelled and the passenger train no.14844 had 29 minutes delay.

4. ANALYSIS AND CONCLUSIONS

4.1. The direct and immediate causes of the railway accident are:

4.1.1. The abandon of the locomotive by the driver contrary to the provisions of article no.199 of Instructions for the operating staff activity in the railway transport no.201/2007 by:

- Inadequate stop of the locomotive by the control switchgroup operation on step 1 not on position „0” and non-operation of the reversing gear from position ” forward” to position ”0” after a complete stop (the control switchgroup was found set on step 1 by the driver who stopped the locomotive DHC 624);
 - The non-assurance of the driver against starting up the locomotive while parking (he didn't applied the handbrake); to the previous tests performed on the conditions imposed by the locomotive operating instructions, recorded in the technical factual report no.117 of February 7, 2008, the tightening-up of the handbrake ensured the locomotive stop until the tractive force increased corresponding to step no.3 of the control switchgroup (including the step no.3);
 - The diesel engine was not stopped;
 - The foreman shunter (the service official in our case) was not informed on the locomotive abandon and on the request of his presence in the cabin.
- 4.1.2. The non-observance of the labour protection norms contrary to the provisions of article no.9, paragraph (1), item s) of the Instructions for the operating staff activity in the railway transport no.201/2007, respectively article no.20, item k, l, r of the own regulations and instructions of labour protection.
- 4.1.3. When the driver of the locomotive DHC 624 realized the consequences of his actions he desperately tried to stop the locomotive but this led to his death.

4.2 The underlying causes that led to the serious railway accident:

- 4.2.1. The locking in position „open” of the operating lever of the air release valve from the brake cylinders with the help of an improvised split pin, this leading to the annulment of the locomotive braking effect when using the automatic brake within the emergency brake controled by the safety , vigilance and control equipments .
- 4.2.2. The technical change of the air release valve from the locomotive brake cylinders of the A command post, determined by the replacement of the splint from the rotation axle of the lever (original construction) with a screw fact that led to the increase of the play to the rotation point and between the exterior shoulder of the case and the beak of the lever.

4.3. The root causes that led to the serious railway accident are connected with the regulation and application framework of the safety management system related to the traction activity that shows the following deficiencies:

- 4.3.1. Technical interventions to the release valve when operating or repairing were performed without having the approval of the constructor or of the designer, those leading to his locking with an improvised split pin. This non-conformity was not noticed and cleared on the occasion of mandatory inspections or of inspections on the operating activity.
- 4.3.2. In their own regulations they didn't stipulated corrective actions in case of unjustified taking out of service of the safety , vigilance and speed control equipments in the shunting activity.
- 4.3.3. This wrong working system was not discovered and the shunting activity continued to be performed by making constructive changes to the air release valve from the brake cylinders fact that led to the annulment of the braking effect when the safety , vigilance and automatic speed control equipments were put into service.
- 4.3.4. The emergency brakes within the shunting activity were not treated (according to the own regulations) fact that didn't allowed to find out the wrong working systems concerning the functioning of the safety , vigilance and automatic speed control equipments. The voluntary mechanical locking with the help of an improvised split pin in „position open” of the operating lever of the air release valve from the brake cylinders of the locomotive can be noticed on the speed recording tape of the speed –recorder by marking the putting into operation of the punctual speed control device (INDUSI) without decreasing

the speed curve to zero in case of the displacement of the isolated locomotive.

- 4.3.5. The safety and vigilance installation (DSV) available on the Locomotive DHC 624 is not being designed so that the punctual speed control device (IVMS) from the locomotive could allow a specific record from which it should result if this installation was taking out of service or if it was put into operation owing to non-handling.

4.4. Deficiencies and shortcomings established during the investigation but without relevance to the conclusions on causes

On the occasion of the serious railway accident investigation were found a series of non-conformities to the operating staff without having an influence to the railway event, this non-conformities being produced after the railway event occurrence as follows:

- Performing the duty by the diesel multiple unit driver without being ordered and receiving the approval of the competent staff, contrary to the provisions of article no.12, paragraph (1), item g) of the *Instructions for the operating staff activity in the railway transport no.201/2007*, meaning that „to the operating is forbidden to replace other employees or to be replaced without having an approval of the competent staff”;
- The inspection non-performance by the service official from the halt on the driver presence to the post, contrary to the provisions of article no.26, paragraph (1) of the *Instructions for the operating staff activity in the railway transport no.201/2007*, meaning that „the operating staff that is going to the shift place where the examination of the presence is performed by the IDM, when entering to the station he will go to the IDM on duty in order to examine the general condition and then he shall perform the shift”.
- The non-drawing of the locomotive journey reports, contrary to the provisions of Annex 1, article no.17, paragraph (2) of the *Instructions for the operating staff activity in the railway transport no.201/2007*, meaning that the „driver shall issue the journey report and shall complete, by case, the data of chapter I [...] after which he shall go to the IDM in order to examine the general condition.
- Non- filling in the locomotive incident record, contrary to the provisions of article no.9, paragraph (1), item h) of the *Instructions for the railway on-board staff activity no.201/2007*, namely „during the working time the railway on-board staff must to fill in the locomotive incident record with the data required by the form and the remarks concerning the locomotive operation during the trains hauling or shunting

Also, during the railway accident investigation, one found out lot of non-conformities in the activities carried on by SC RC-CF TRANS SRL Braşov and SC REGIOTRANS SRL Braşov, without any causality connection with its occurrence, as follows:

- Any prescription was not issued concerning the journey reports issuing and filling in by the locomotive driver, as well as for the reception – handing over of the journey reports files, before and after filling in, contrary to the art.17, paragraph (4) from the annex 1 at the *Instructions for the railway on-board staff no.201/2007*, namely that „prescriptions concerning the issuing and filling in of the journey reports by the locomotive driver, as well as the reception – handing over of the journey reports files before and after the filling in are established by the railway undertakings through special regulations”;
- The journey reports format used by the locomotive driver is not in accordance with the format enclosed at the *Instructions for the railway on-board staff activity no.201/2007*, these having no counterfoil, contrary to the art.1-(2) from the annex 1 at the *Instructions for the railway on-board staff no.201/2007*, namely that „the journey reports format, as well as, its contents is the same for all the railway undertakings”;
- Although through the Leaflet no.18 from the Operating Technical Plan of the railway station Odorhei is stipulated that are responsible with the shunting as foreman shunter, they are not trained and authorized for the safety equipments handling from the locomotives, for their pentru stop keeping during the shunting and/or the trains running, in case of driving without

driver's assistant, contrary to the provisions of the art. 234, paragraph. (1) from the Regulation for Railway Technical Operating *no.002/2001* and to the provisions of the chapter III, point 3 and of the chapter IV, point 3 of the Order of the General Direction of Traction no. 310/1/441/1993 *Regulations concerning the experimenting of the simplified operating of the locomotives*;

- No written instruction is transmitted on the trains hauling way, as well as driving and operating of the locomotives and motorised trains, for the cases not included in the arrangements of shifts and the working program established periodically.

5. MEASURES TAKEN FOLLOWING THE EVENT:

- 5.1. The intermediary report was sent to SC RC-CF TRANS SRL Braşov in order to be informed about its possible opinions or points of view and to transmit the measures already taken following the railway accident.
- 5.2. SC RC-CF TRANS SRL Braşov informed that the non-conformities found out without causality connection with the railway accident occurrence were removed and discussed with the interested staff.
- 5.3. Romanian Railway Safety Authority will look after the removal of these non-conformities without causality connection with the railway accident occurrence.

6. RECOMMENDATIONS:

- 6.1. To train again the operating staff on the conditions that is allowed to leave the locomotive when standstill and on the measures that must be taken by the driver in case without driver's assistant.
- 6.2. To train again the operating staff on the labour protection norms concerning the interdiction of boarding a locomotive in motion.
- 6.3. To train the operating staff on the consequences of permanent locking of the operating lever from the air release valve of the locomotive brake cylinders by using any method that does not correspond to the instructions.
- 6.4. An urgent technical inspection of the air release valves from the brake cylinders from all the locomotives and the irregularities clearance in order to observe the execution project.
- 6.5. To improve the safety management system by:
 - Regulation for tracking and solving all the nonconformities of the emergency brakings performed within the shunting activity;
 - Regulation in order to revise the staff errors in case of taking out of service in an unjustified way or of a voluntary locking not according to the instructions of the safety, vigilance and automatic speed control installations within the shunting activity;
 - Tracking the wrong working systems in the shunting activity related to the safety, vigilance and automatic speed control installations that were taking out of service or improperly voluntarily locked by analysing and performing a mandatory examination of all recorded cases of putting into service of the vigilance device without decreasing the speed curve to zero in case of the displacement of the isolated locomotive;
 - Establishing through the job sheets the tasks concerning the transfer, reading and dealing with the speed –indicator records and also to revise the irregularities established on this occasion of the speed recorder records as well as the removal of the non-conformities found out then.

- 6.6. To establish the opportuneness that the punctual speed control device (IVMS) installation can perform a specific record from which it should result if this installation was taking out of service or was put into service owing to the non-handling.
- 6.7. To establish the opportuneness of constructive changes to the air release valves of the locomotive brake cylinders from all locomotives type DHC in order to stop the use of improvised systems by locking these valves in „open position”.

The final report will be sent to all the railway licensed undertakings that have in their list stock locomotives type DHC and to the Romanian Railway Safety Authority.

Romanian Railway Safety Authority will look after the observance of these recommendations.