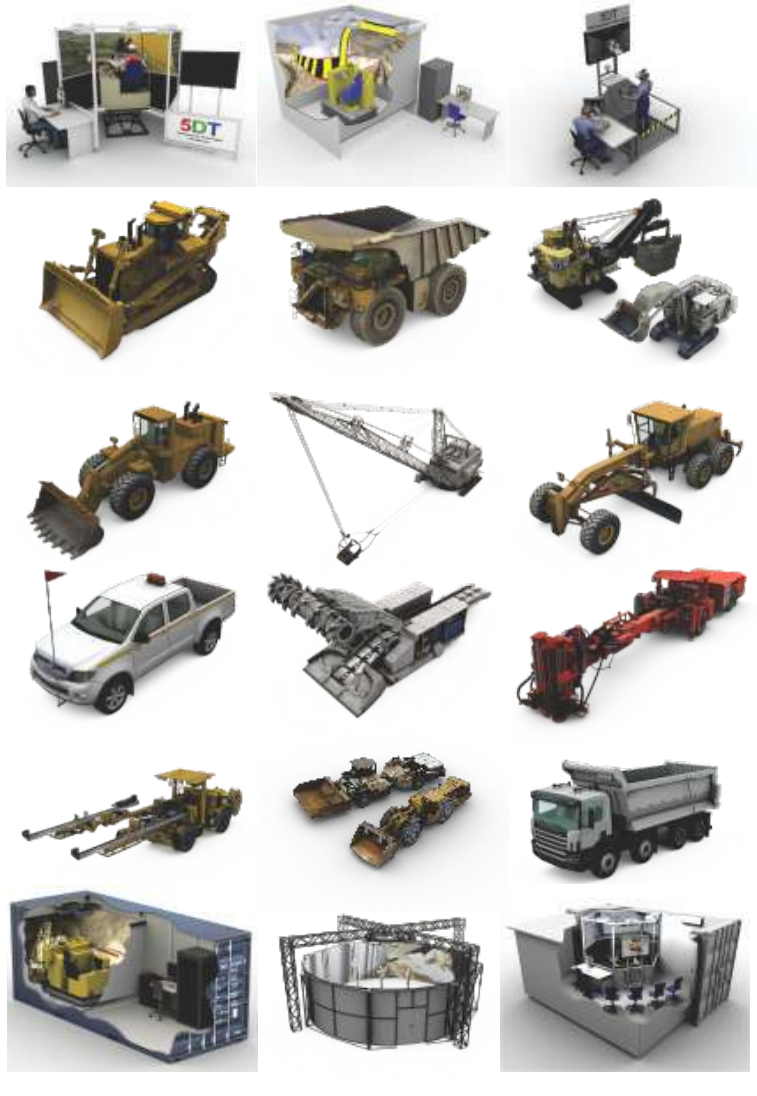
5DT

Fifth Dimension Technologies

Training Solutions for Mining, Construction and Transport



Welcome to the 5DT Training Solutions pocketbook!

This book is a short-form overview of our products, services and capabilities. It provides an introduction to our company and highlights the benefits of training simulators for your organization. The benefits of our integrated training plan are also explained.

We trust that this book will help you to design a training solution that will fulfill your organization's safety, productivity and maintenance objectives. Please contact us if you need assistance with this process.

The 5DT Vision is:

We make operators Safer, more Productive and less Destructive! *TM*

We invite you to join us on our quest.

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ABOUT 5DT

5DT makes operators safer, more productive and less destructive using advanced training tools that have been optimized on mining and construction sites around the world over the past 15 years.

5DT offers a Training ***Solution***, not merely training simulators. The 5DT training solution consists of the following elements:

- **Training Simulators**
- **Pre-Simulators**
- **Computer Based Training (CBT) Systems** (E-Learning)
- **Visualizers**

5DT has a well established Mining, Construction and Transport Knowledge Base. We have spent a lot of time underground, in surface mines, on construction sites and on the road interacting with real operators and real machines. We also work closely with the world's best training departments and schools to refine our methodologies, products and learning material.

Product Families

5DT offers complete Training Simulator families for underground mining, surface mining, construction and transport:

- Underground Coal Mining Training Simulators
- Underground Hard Rock Mining Training Simulators
- Surface Mining Training Simulators
- Construction Training Simulators
- Transport Training Simulators
- Military Training Simulators

Worldwide Installation Base

5DT is proud to have the following prestigious organizations as customers.

- BHP Billiton
- Anglo Platinum
- Xstrata
- VALE
- Sasol
- INADEH
- Anglo Coal
- Peabody Energy
- SENA
- Patriot Coal
- Agnico-Eagle
- Kentucky Coal Academy
- SA Air Force
- TAFE
- Fortescue Metals Group
- Mining Industry Skills Centre
- EADS
- Foskor

Original Equipment Manufacturers (OEMs)

5DT uses Real OEM Parts in its simulators and has developed training simulators for machines by the following OEMs.

- Caterpillar
- Bucyrus
- JOY
- Fletcher
- Scania
- ARO
- Komatsu
- Terex
- Sandvik
- Wirtgen
- Fermel
- GHH
- Liebherr
- O&K
- Atlas Copco
- Toyota
- AARD

Advanced Technologies by 5DT:

- 6 Degrees of freedom (6-DOF) electrical motion base
- High performance ground interaction technology
- Active force-feedback steering
- 360° Field of view training simulators and visualization studios
- SimCAB™ swap-out within 3 minutes without the use of any tools or cranes

5DT works very closely with its customers. This approach has led to unprecedented growth for 5DT.

We look forward to working with you in the near future.

TRAINING SOLUTION BENEFITS

5DT Training solutions enable an organization to develop both the *Knowledge* as well as the *Skills* of its personnel. This approach offers a wide range of benefits for all departments of an organization, such as:

Corporate and Investors

- Higher Return on Investment (ROI):
  - Increased production
  - Lower maintenance costs
  - Reduced number of accidents
- Lower risk
- Improve skills and knowledge of workforce
- Better corporate image

Human Resources (HR)

- Screening of new employees
- Training of local populations
- Off-site recruitment
- Off-site training
- Higher workplace skills and knowledge

Training

- Training of new operators
- Evaluation (assessment) and re-training of existing operators
- Familiarization and induction tool
- Shorter operator training periods
- Greater training flexibility
- 24/7 Training
- Consistent high training standard
- Accurate training paper trail

Operations and Business Improvement

- Increase productivity
- Reduce loss of production as a result of training with real machines
- Improve application of best practices
  - Evaluate current best practices in simulator
  - Optimize best practices in simulator
  - Use simulator as instrument to roll out best practices into an organization
- Enhance operator skills development

Maintenance

- Reduce machine damage and wear and tear
- "Park and test" machine training for mechanics and artisans

Health and Safety

- Increase safety awareness
- Practice life-threatening scenarios without risk of injury or risk of damage to equipment. The correct response to an emergency may be practiced over and over again.
- Ensure that personnel has been trained to handle emergencies.
- Training of operators of machines with no passenger seat
- Reconstruction of accidents
- Implementation of changed policies and/or SOPs

Marketing and PR

- Showcase operations to groups of people without exposing them to typical mine hazards.
- Showcase operations far away from the site, for example on a trade show floor.

Environment

- Reduce burning of greenhouse gases because real machines are not used for training.

Research and Development (R&D)

- Try new techniques and procedures in the simulator first, before validating it in reality.
- Check machine compatibility with site design before the start of procurement and/or construction

Overall

- Increase ***Motivation***: The combination of increased safety awareness, increased production, smarter production and reduced machine damage normally leads to a highly motivated workforce.

THE 5DT INTEGRATED TRAINING PLAN

5DT offers a Training Plan, not merely Training Simulators.

Our training plan has been developed to provide a systematic development of the trainee's knowledge and skills.

The Training Plan has 4 stages:

Computer Based Training (CBT) Systems

Knowledge Transfer

Objective

Teaches the trainee the theory, basics and terminology of a specific machine. The CBT is delivered at the site or via the worldwide web (online).

Visualizers

Knowledge Transfer

Objective

Teaches the trainee where the specific machine fits into the overall process. Gives the trainee a big-picture, holistic view. It is ideal for coordination and supervisor training.

Pre-Simulators

Skills Transfer

Objective

Teaches the trainee the controls of a specific machine, so that no time is wasted teaching controls on the main simulator.

Training Simulators

Skills Transfer

Objective

Submits the trainee to training scenarios, ranging from easy to difficult. Teaches the trainee how to handle the machine during emergencies.

With the 5DT Training Plan you can have more than 10 persons training at the same time, instead of a single person in a simulator, as offered by conventional training simulator providers.

TRAINING SIMULATORS

OVERVIEW

A 5DT Training Simulator consists of a Simulator Base System (SimBASE™) and a Simulated Machine Cab (SimCAB™):

Simulator = SimBASE™ + SimCAB™

The Simulator Base System (SimBASE™) acts as a base framework. It consists of a visual display system, computer hardware, an instructor station and a motion base. It also includes software functionality.

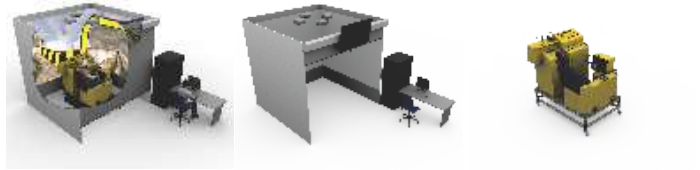
The Simulated Machine Cabs (SimCABs™) are modular units that resemble specific mining, construction and transport machines/vehicles that are simulated. It consists of a simulated cab built with real OEM parts, machine controls and instruments. It also includes software functionality specific to the real machine that is being simulated.

The SimCABs™ are rolled into the SimBASE™ on transport trolleys (dollies). Several different SimCABs™ may be used with a single SimBASE™.

5DT offers 4 different types of Simulator Base Systems (SimBASEs™):

Hexagon-type Simulator Base System:	SimBASE™ - HEX
Cube-type Simulator Base System:	SimBASE™ - CUBE
Head Mounted Display Simulator Base System:	SimBASE™ - HMD
Pre-Simulator Base System:	SimBASE™ - PRE

Simulator HEX = SimBASE™ HEX + SimCAB™



Simulator CUBE = SimBASE™ CUBE + SimCAB™

Simulator HMD = SimBASE™ HMD + SimREMOTE™

Simulator PRE = SimBASE™ PRE + SimCAB™

General Simulator Base System (SimBASE™) Features:

- User management
- Weather settings (dust, fog, rain)
- Graphs, metrics & reports
- Record and playback
- Continuous monitoring of operators and error logging in all training scenarios
- Time of day settings (day, dusk, night, dawn)
- Outside view (e.g. top-down view) on instructor and classroom screens
- Simulator safety switch for instructor

General Simulated Machine Cab (SimCAB™) Features:

(*Specific* SimCAB™ Features are shown separately with each machine)

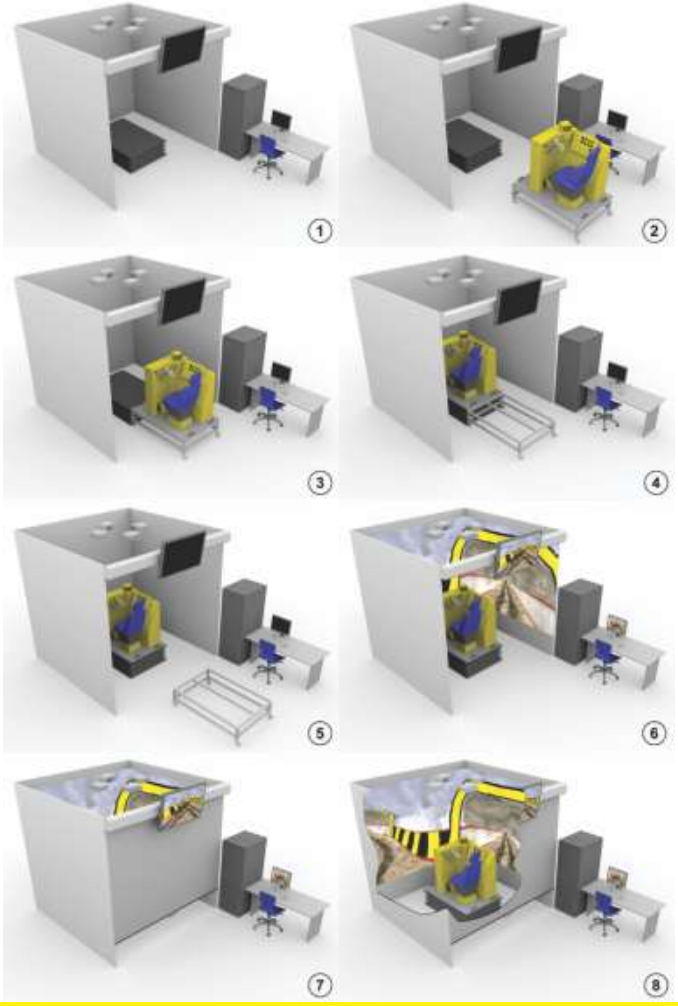
- The same SimCABs™ may be interchanged between any 5DT SimBASE™.
- Realistic machine cab with real OEM controls
- Photorealistic virtual machine
- Photorealistic virtual terrain
- Realistic ground interaction
- Realistic machine engine model
- Realistic physics (dynamic model) for operator
- Training scenarios
- Operator errors
- Machine failures
- Production metrics
- Easy machine console swap-out
- Single connector interface with computer
- Simulator safety switch
- Instructor initiated events (e.g. brake failures, engine fires tire bursts, machine failures)

General Training Scenarios for SimCABs™:

(*Specific* Training Scenarios are shown separately with each machine)

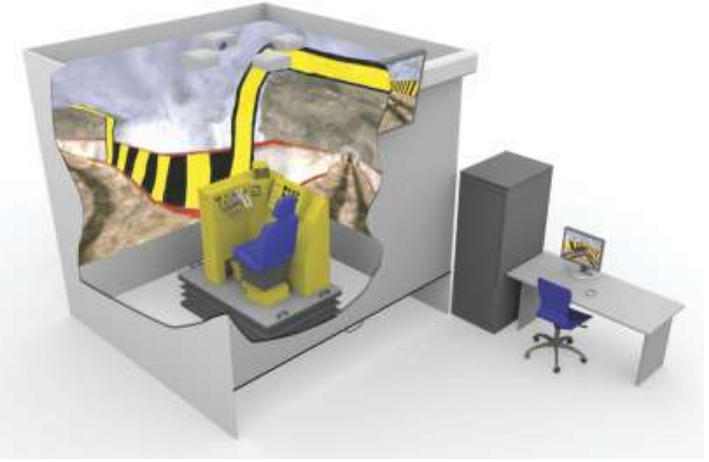
- Machine startup
- Machine shutdown
- Machine part movements
- General driving
- Controls familiarization (pre-simulator)

SimCAB™ SWAP-OUT



Swap-Out in Less than 3 Minutes

SimBASE™ - CUBE



The 5DT Cube-Type Simulator Base System (SimBASE™ - CUBE) includes 4 projectors, 4 projection screens, a classroom screen, a computer system, a motion base and an instructor station. The Simulator Base System accommodates a wide variety of Simulated Machine Cabs (SimCABs™) and Simulated Machine Remotes (SimREMOTEs™) for Underground Coal Mining, Underground Hard Rock Mining, Surface Mining and Construction machines. The Cube-Type simulator family has been developed specifically for Underground Mining training simulator applications

Features

- Modular solution
- High immersion (360° horizontal and 67.5° vertical field of view)
- Wide range of SimCABs™ and SimREMOTES™ available
- 6 Degrees of freedom (6-DOF) motion base
- Ultra low profile motion base available (for machines where the operator is required to stand upright when operating the machine)
- Classroom screen
- Motorized rear screen
- Surround-sound
- Easy SimCAB™ swap-out
- Single connector interface with machine consoles
- Colour laser printer for reports
- Virtual instruments shown on instructor and classroom screens
- Safety switches for instructor and operator
- Ideal for groups and team training
- Most versatile solution

SimCAB™ Swap-Out

- Less than 3 minutes swap-out time
- No tools or cranes required

SIMULATOR BASE SYSTEMS - HEXAGON

SimBASE™ - HEX

The 5DT Hexagon-Type Simulator Base System (SimBASE™ - HEX) includes 3 projectors, 3 projection screens, a large rear-view LCD screen, a classroom screen, a computer system, a motion base and an instructor station. The Simulator Base System accommodates a wide variety of Simulated Machine Cabs (SimCABs™) and Simulated Machine Remotes (SimREMOTEs™) for Underground Coal Mining, Underground Hard Rock Mining, Surface Mining, Construction and Transport machines/vehicles.

Features

- Modular solution
- High degree of classroom interaction
- Wide range of SimCABs™ available
- 210° Horizontal field of view (180° front, 30° rear)
- 45° Vertical field of view
- 6 Degrees of freedom (6-DOF) motion base
- Safety switches for instructor and operator
- Classroom screen
- Rear-view screen
- Surround-sound
- Easy SimCAB™ swap-out
- Single connector interface with SimCABs™
- Colour laser printer for reports
- Virtual instruments shown on classroom screen

SimCAB™ Swap-Out

- Less than 3 minutes swap-out time
- No tools or cranes required

SIMULATOR BASE SYSTEMS - HMD

SimBASE™ - HEAD MOUNTED DISPLAY (HMD)

The Head Mounted Display-type Simulator Base System (SimBASE™ - HMD) is an ergonomic framework that includes a head mounted display (HMD), a head tracker, an LCD classroom screen, a barricaded training area with anti-slip flooring and an instructor station. The Simulator Base System accommodates a wide variety of Simulated Machine Remotes (SimREMOTEs™) for Underground Coal Mining and Underground Hard Rock Mining machines.

Applications

The system offers a wide range of applications for training simulators and viewing stations, for example:

- Continuous Miner and Longwall Mining Training Simulators
- Virtual Reality Viewing Stations
- Virtual Binoculars and Virtual Laser Range Finder Viewing Stations
- Welding and Spray Painting Simulators

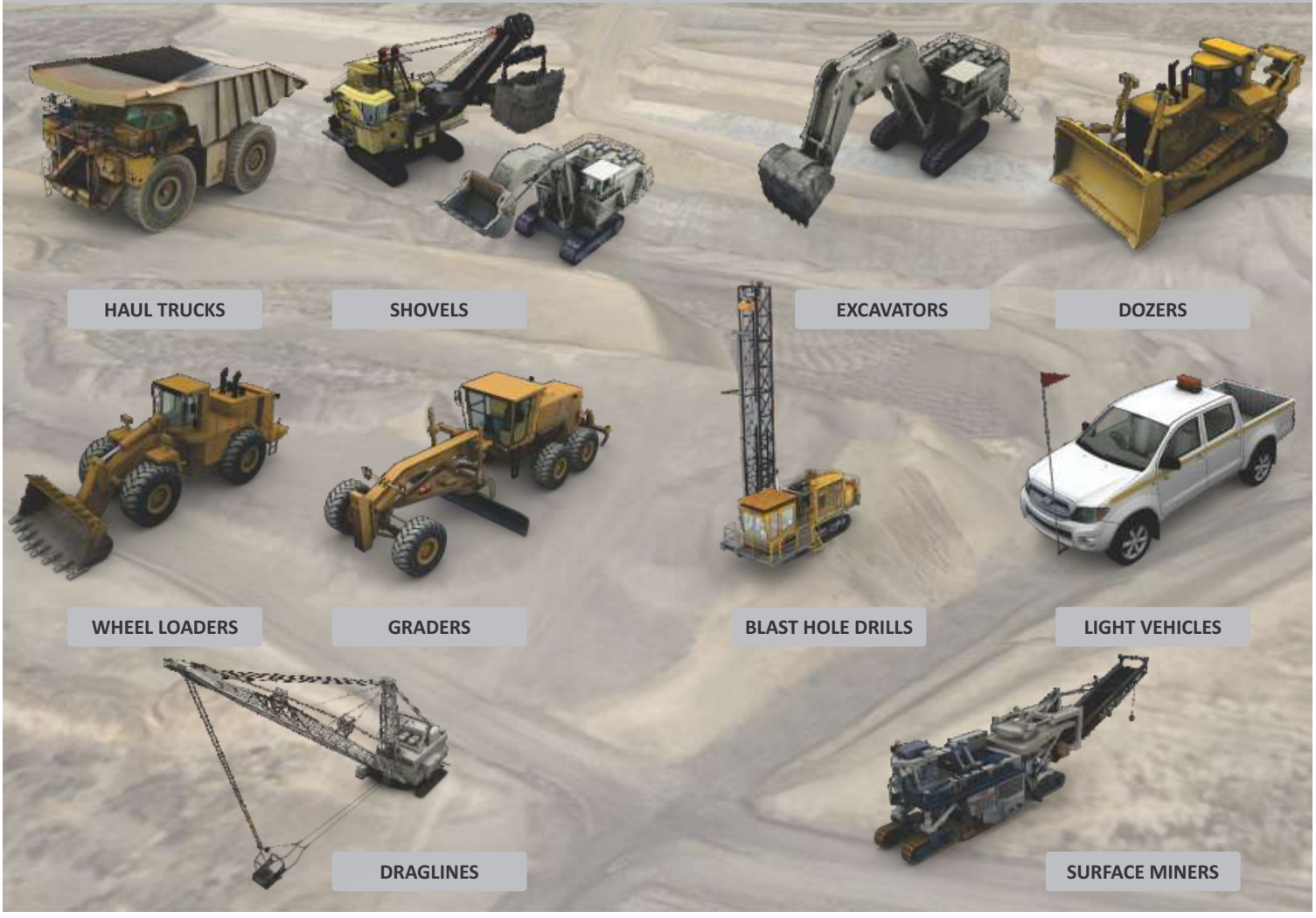
Features

- Modular solution
- High degree of classroom interaction
- Integrated solution
- Non-slip floor material
- Classroom screen
- Barricaded training area
- Colour laser printer for reports
- Easy-to-reach HMD stowage
- Single connector interface with SimREMOTEs™

An HMD Setup generally works best for applications where the real vehicle/machine is operated with a wireless remote control device, for example a Continuous Miner or a Longwall Shearer.

SURFACE MINING SIMULATORS

OVERVIEW



HAUL TRUCK TRAINING SIMULATOR

This simulator develops the skills of a Haul Truck operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Electrical drive and mechanical drive truck models available
- Major suppliers accommodated
- Artificial intelligence (AI) shovels and excavators

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Parking truck for loading by shovel and excavator
- Loading Patterns:
  - Back-up
  - Drive-by
  - Single-side
  - Double-side
  - Modified back-up
- Hauling material
- Retarder use
- Brake test
- Dumping material at crusher
- Dumping material at waste dump

Emergency Training Scenarios:

- Brake failure
- Engine fire
- Tire fire
- Tire burst
- Hydraulic failures

SHOVEL TRAINING SIMULATOR

This simulator develops the Skills of a Shovel operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Advanced ground interaction software
- Hydraulic and electric (rope) shovel models available
- Artificial intelligence (AI) haul trucks
- Cycle time analyses
- Simulation of on-board systems

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Loading a truck with shovel:
  - Single side back-up
  - Dual side back-up
  - Modified back-up

Emergency Training Scenarios:

- Fires
- Hydraulic failures

SURFACE MINING
EXCAVATOR TRAINING SIMULATOR

This simulator develops the Skills of an Excavator operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Advanced ground interaction software
- Artificial intelligence (AI) haul trucks

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Digging a trench
- Loading a truck with excavator:
  - Bench back-up
  - Bench drive-by
  - Top loading
  - Trench loading
  - Stockpiling
  - Building a ramp

Emergency Training Scenarios:
- Fires
- Hydraulic failures

SURFACE MINING
WHEEL LOADER TRAINING SIMULATOR

This simulator develops the Skills of a Wheel Loader operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Advanced ground interaction software

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Loading a truck
- Stockpiling
- Brake test

Emergency Training Scenarios:
- Fires
- Hydraulic failures

DOZER TRAINING SIMULATOR

This simulator develops the Skills of a Dozer operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Advanced ground interaction software
- Rear screen for ripping

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Levelling an area
- Cutting a V-ditch
- Ripping
- Stockpiling
- Cleanup at loading area
- Overburden (topsoil) removal
- Pushing material over
- Shaping walls (berms)
- Shaping embankments
- Filling a trench
- Removing trees

GRADER TRAINING SIMULATOR

This simulator develops the Skills of a Grader operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Advanced ground interaction software
- Lever-type and joystick-type control models available
- Collision detection between machine parts

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Levelling an area
- Ripping
- Shaping embankments
- Levelling a road
- Mixing material
- Cutting a V-ditch
- Stockpiling
- Grading a cul-de-sac
- Trimming

DRAGLINE TRAINING SIMULATOR

This simulator develops the Skills of a Dragline operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Propel Mode (walking) and Production Mode (dragging)
- Accurate simulation of dragline system
- Accurate shadows to facilitate better depth perception
- Production analyses tool - measures the relevant data of each of the production cycle elements: Drag, Swing, Spoil, Return-Swing, Spot
- This data is compared to editable baselines that are set by the instructor
- Real-time overlays of bucket zones
- Real-time overlays of dragline dials and instruments
- Advanced reporting - results are categorized such that an instructor can easily identify problem areas
- Advanced rope dynamics model
- Advanced ground interaction model

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Walking
- Production Cycle: Drag, Swing, Spoil, Return-Swing, Spot

SURFACE MINER TRAINING SIMULATOR

This simulator develops the Skills of a Surface Miner operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Artificial intelligence (AI) haul trucks

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Steering modes
- Starting a cut (ramping down)
- Park-up in cut
- 3-Point turn
- Cutting against the high wall
- Cutting a strip (continuous loading)
- Alignment for cutting
- Completing a cut (ramping up)
- Park-up outside cut
- U-Turn
- Cutting a strip (windrow)

BLAST HOLE DRILL TRAINING SIMULATOR

This simulator develops the Skills of a Blast Hole Drill (Surface Drill) operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Tramming (driving) and drilling
- Realistic cab
- Drill string management
- Drill process management
- Tri cone drilling (rotation)
- Down hole drilling (percussion)

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Leveling of machine
- Bit changing
- Drilling sequences
- Tower raising and lowering
- Pre-start checks

Note:

5DT may also provide training simulators for Exploration Drills and Directional Drills.

LIGHT VEHICLE TRAINING SIMULATOR

This simulator develops the Skills of a Light Vehicle operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Driving in a live mine with haul trucks and other machines
- Manual, automatic or semi-automatic gearboxes
- On- and off-road terrain databases

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

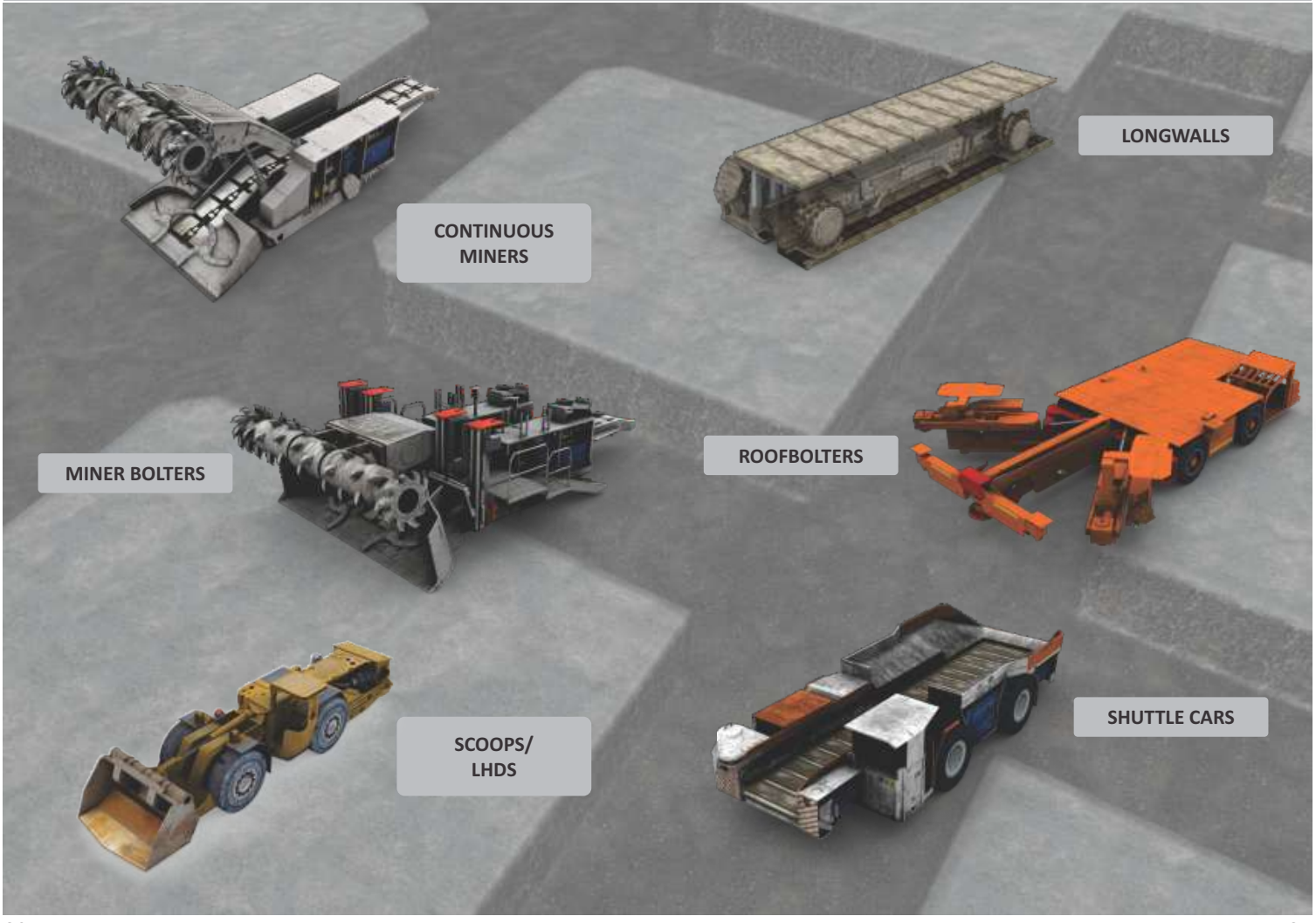
- Brake test
- Collision avoidance
- 4WD driving skills

Note:

The light vehicle training simulator may also be used to train drivers for underground conditions like coal mines and hard rock mines. It is also useful for construction training.

UNDERGROUND COAL MINING SIMULATORS

OVERVIEW



UNDERGROUND COAL MINING

CONTINUOUS MINER (CM) TRAINING SIMULATOR

This simulator develops the Skills of a Continuous Miner operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Simulated remote control (with radio device) or on-board (from cab) operation
- Artificial intelligence (AI) shuttle cars and humans
- Different seam heights simulated

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

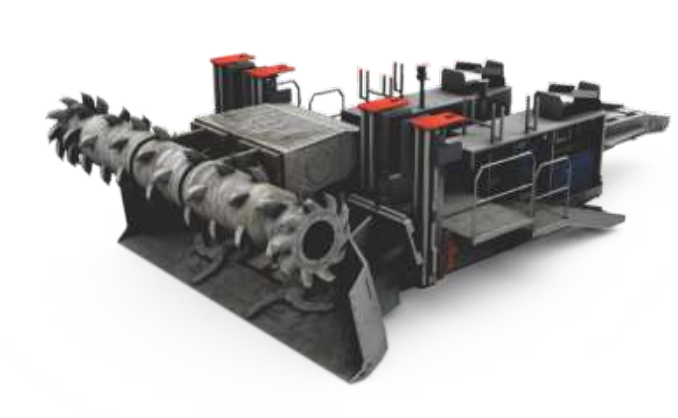
- Alignment with coal face
- Cutting cycle
- Cutting a cross-cut
- Sweeping the floor
- Trimming the roof

Emergency Training Scenarios:

- Gas detected
- Machine failure under unprotected roof

UNDERGROUND COAL MINING

MINER-BOLTER TRAINING SIMULATOR



This simulator develops the Skills of a Miner-Bolter operator team. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Team trainer (miner-operator and bolter-operator may work simultaneously)
- Artificial intelligence (AI) shuttle cars

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Cutting cycle
- Bolting cycle

UNDERGROUND COAL MINING

SCOOP/LHD TRAINING SIMULATOR

This simulator develops the Skills of a Scoop/LHD operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Scoop or Load Haul Dump (LHD) virtual machine
- Artificial intelligence (AI) continuous miner

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Loading/Scooping material
- Hauling material
- Brake test

UNDERGROUND COAL MINING

SHUTTLE CAR TRAINING SIMULATOR

This simulator develops the Skills of a Shuttle Car operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- North-south (stick-steer) and side-saddle machine models
- Low seam and high seam machine models
- Artificial intelligence (AI) continuous miner

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Loading material at the continuous miner
- Hauling/shuttling material
- Discharging material at the feeder breaker

UNDERGROUND COAL MINING
ROOF BOLTER TRAINING SIMULATOR

This simulator develops the Skills of a Roof Bolter operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Virtual tool table
- Team trainer
- Left boom and right boom operation
- Joystick-type and lever-type operation
- 'Spin to stall' and 'spin & hold' bolt installation cycles
- Configurable cycle timing and evaluation

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Deploying the Temporary Roof Support (TRS)
- Installing single bolts
- Installing bolt patterns

UNDERGROUND COAL MINING
LONGWALL TRAINING SIMULATOR

This simulator develops the Skills of a Longwall operator team. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

The trainee controls the machine with the same radio controller that is used for the real machine. The trainee is first taught how to start the shearer. The trainee is then taught how to operate the radio device. From this point the trainee moves on to cutting coal with the shearer. The trainee can control the primary and secondary booms, the cutting drums, the cutting direction, the water spray booms and the cowels.

The support shields of the longwall are controlled from the simulator keyboard.

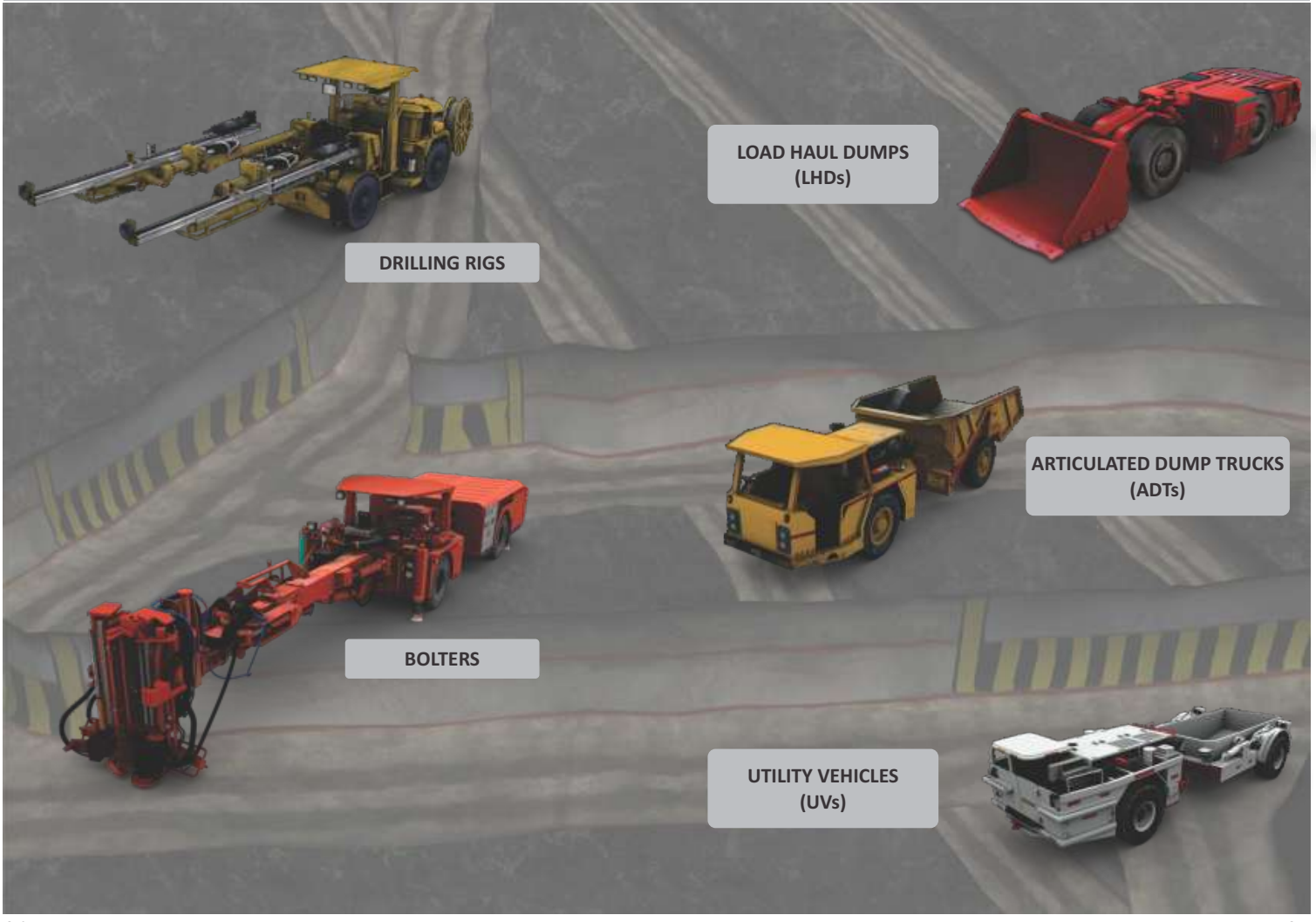
Apart from teaching the trainee how to control the shearer, this simulator is also very useful to teach trainees about the long wall process. The trainee may 'walk' up and down the long wall underneath the plates. The trainee may view the advancement of the long wall in accelerated mode, leading to rapid understanding of the process. The system also has a see-through mode where the long wall may be viewed from any angle through the coal.

Features:
- Real shearer remote control used in simulator

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Cutting coal (to tailgate)
- Cutting coal (to maingate)
- Movement of support shields

UNDERGROUND HARD ROCK MINING SIMULATORS

OVERVIEW



UNDERGROUND HARD ROCK MINING
DRILLING RIG TRAINING SIMULATOR

This simulator develops the Skills of a Drilling Rig operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Analyses of individual holes
- Analyses of drilling patterns
- Tramming controls as well as drilling controls

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Collision avoidance
- Drilling single holes
- Drilling hole patterns

Emergency Scenarios:
- Brake failure
- Machine fire

UNDERGROUND HARD ROCK MINING
LOAD HAUL DUMP (LHD) TRAINING SIMULATOR

This simulator develops the Skills of an LHD operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Artificial intelligence (AI) haul trucks and humans

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Collision avoidance
- Loading material (bogging)
- Hauling material
- Dumping material
- Dumping material on trucks
- Brake test

Emergency Scenarios:
- Brake failure
- Machine fire

BOLTER TRAINING SIMULATOR

This simulator develops the Skills of a Bolter operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Analyses of individual bolts
- Analyses of bolting patterns
- Tramming controls as well as bolting controls

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Collision avoidance
- Installing single bolts
- Installing bolt patterns

Emergency Scenarios:
- Brake failure
- Machine fire

ARTICULATED DUMP TRUCK TRAINING SIMULATOR

This simulator develops the Skills of an ADT operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Artificial intelligence (AI) Load Haul Dumps (LHDs) and humans

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Collision avoidance
- Park truck for loading
- Hauling material
- Dump material
- Brake test

Emergency Scenarios:
- Brake failure
- Machine fire

UNDERGROUND HARD ROCK MINING

UTILITY VEHICLE (UV) TRAINING SIMULATOR

This simulator develops the Skills of a Utility Vehicle (UV) operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:
- Artificial intelligence (AI) vehicles and humans

Specific Training Scenarios:
(*General* Training Scenarios are shown separately under Training Simulator Overview)
- Collision avoidance
- Brake test
- Deploying cassette
- Picking up cassette

Emergency Scenarios:
- Brake failure
- Machine fire

OTHER TRAINING SIMULATORS

5DT offers a wide variety of simulators for other industries, such as:

Port Training Simulators
- Bulk Ship Loader (shown above)
- Container Crane
- Stacking Crane
- Straddler Crane
- Yard Tractor

Crane Training Simulators
- Mobile Crane (telescopic boom)
- Tower Crane
- Gantry Crane

Industrial Simulators
- Welding Simulator
- Spray Painting Simulator

Aerospace and Defence Training Simulators
- Aircrew Training Simulators (Pilot, co-pilot, flight engineer, navigators, radar operators, radio operators, observation officers)
- Gunnery Crew Training Simulators
- Driving Training Simulators (Military Vehicles)

Please contact us if you have a requirement for a simulator not listed above or if you need more information.

CONSTRUCTION TRAINING SIMULATORS

OVERVIEW

EXCAVATORS

DOZERS

GRADERS

FRONT-END LOADERS

ROAD TRUCKS

MOBILE CRANES

GRADER TRAINING SIMULATOR

This simulator develops the Skills of a Grader operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Lever-type and joystick-type control models available
- Advanced ground interaction software
- Virtual road construction landscape

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Levelling an area
- Ripping
- Shaping embankments
- Levelling a road
- Mixing material
- Cutting a V-ditch
- Stockpiling
- Grading a cul-de-sac
- Trimming

DOZER TRAINING SIMULATOR

This simulator develops the Skills of a Dozer operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Advanced ground interaction software
- Virtual road construction landscape
- Rear screen for ripping

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Levelling an area
- Ripping
- Cleanup at loading area
- Pushing material over
- Shaping embankments
- Removing trees
- Cutting a V-ditch
- Stockpiling
- Overburden (topsoil) removal
- Shaping walls (berms)
- Filling a trench

EXCAVATOR TRAINING SIMULATOR

This simulator develops the Skills of an Excavator operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Advanced ground interaction software
- Virtual road construction landscape

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Levelling an area
- Digging a trench
- Loading a truck:
  - Bench back-up
  - Bench drive-by
  - Top loading
  - Trench loading
- Stockpiling
- Removing trees
- Laying pipes

FRONT-END LOADER TRAINING SIMULATOR

This simulator develops the Skills of a Front-End Loader operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Advanced ground interaction software
- Virtual road construction landscape

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Filling a trench
- Loading a truck
- Stockpiling
- Brake test
- Cleaning an area

ROAD TRUCK TRAINING SIMULATOR

This simulator develops the Skills of a Road Truck operator. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Manual, automatic or semi-automatic gearboxes
- On- and off-road terrain databases
- Artificial intelligence (AI) vehicles

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Parking for loading by excavator
- Brake test

Note:

This training simulator can also be used to train operators for mining and transport applications.

MOBILE CRANE TRAINING SIMULATOR

This simulator develops the Skills of Mobile Crane operators. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Rough Terrain and All Terrain cranes
- Tramming (driving) and handling of objects

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Stabilization of machine
- Boom deployment and stowing
- Lifting of objects
- Positioning of objects
- Working with spotters

Note:

5DT may also provide training simulators for Gantry Cranes, Tower Cranes, Harbour Cranes and Container Cranes.

MILITARY

MILITARY VEHICLE TRAINING SIMULATORS

These simulators develop the Skills of the following military vehicle operators:

- Commanders
- Drivers
- Weapons Systems Operators

Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Training Simulators:

- Light Vehicles (e.g. Humvee, Landrover or Jeep)
- Trucks (supply trucks, troop carriers, low bed trucks)
- Armoured Personnel Carriers (APCs)
- Infantry Fighting Vehicles (IFVs)
- Main Battle Tanks (MBTs)

Engineering Corps Training Simulators:

(Please refer to the CONSTRUCTION section of this pocketbook for detail descriptions)

- Graders
- Excavators
- Dozers
- Tractor-Loader-Backhoes (TLBs)
- Front End Loaders (Wheel Loaders)
- Construction Cranes

TRANSPORT

PASSENGER BUS TRAINING SIMULATOR

This simulator develops the Skills of a Passenger Bus driver. Skills are developed progressively by subjecting the trainee to general, specific and emergency Training Scenarios. Operator errors are recorded and reported.

Features:

- Left-hand and right-hand drive available
- Single and Articulated (Tandem) buses are available
- Various trailer configurations are available

Specific Training Scenarios:

(*General* Training Scenarios are shown separately under Training Simulator Overview)

- Various traffic conditions
- Emergency situations
- Bus failure conditions
- Bus parking

Other Transport Training Simulators:

- Road Truck Simulator
- Light Vehicle Simulator

TERRAIN DATABASES

The training simulators come standard with a generic terrain database.
Site-specific terrain databases may be developed on request at additional cost. These virtual mines closely resemble the real mines.

SIMULATOR BASE SYSTEMS: PRE-SIMULATORS

SimBASE™ - PRE

Pre-Simulators are used to teach the trainee how to identify and operate the controls of a machine. The use of a pre-simulator station frees up the main simulator. A Pre-Simulator consists of a Simulator Base System (SimBASE™ - PRE) and a Simulated Machine Cab (SimCAB™). The Pre-Simulator utilizes the same SimCABs™ that are used in the Main Simulator. If a SimCAB™ is not used in the Main Simulator, it can be used productively in the Pre-Simulator.

Pre-Simulator training generally develops the Skills of a trainee, specifically focused at machine controls. It helps to develop muscle memory and rapid reaction in an emergency.

Benefits:

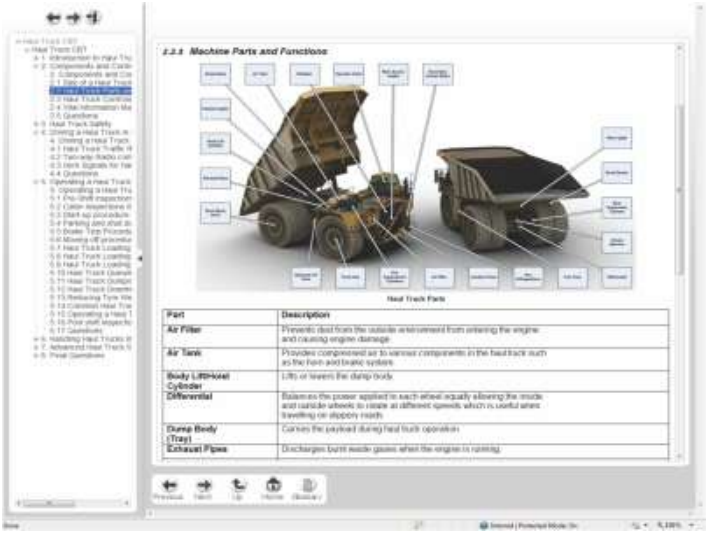
- Trainees can familiarize themselves with the controls of a vehicle/machine before going to the main simulator. This ensures that valuable main simulator time is not wasted on teaching a trainee the machine basics.
- Machine controls familiarization in the pre-simulator can take place in parallel with scenario-based training in the main simulator. More people can therefore be trained simultaneously.
- Training can generally be conducted without an instructor present.

Features:

- Explore Mode
- Test Mode
- Instruct Mode
- Voice commands

COMPUTER BASED TRAINING

OVERVIEW

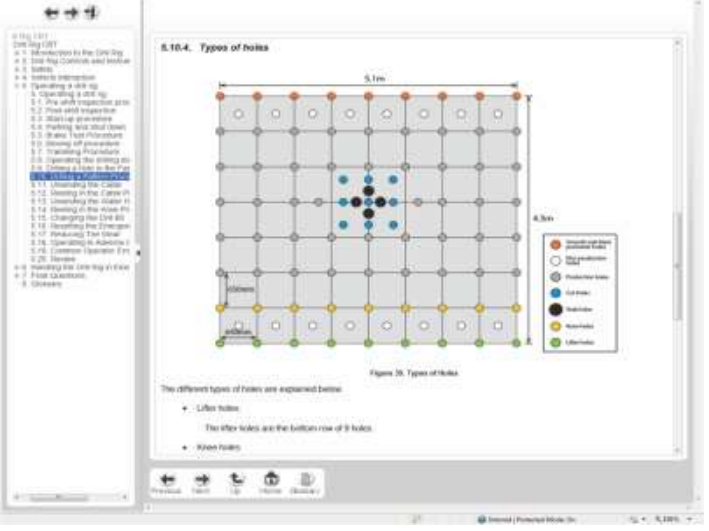


Computer Based Training (CBT) is ideal for teaching trainees the basics before they graduate to simulator training.

CBT generally develops the Knowledge of a trainee.

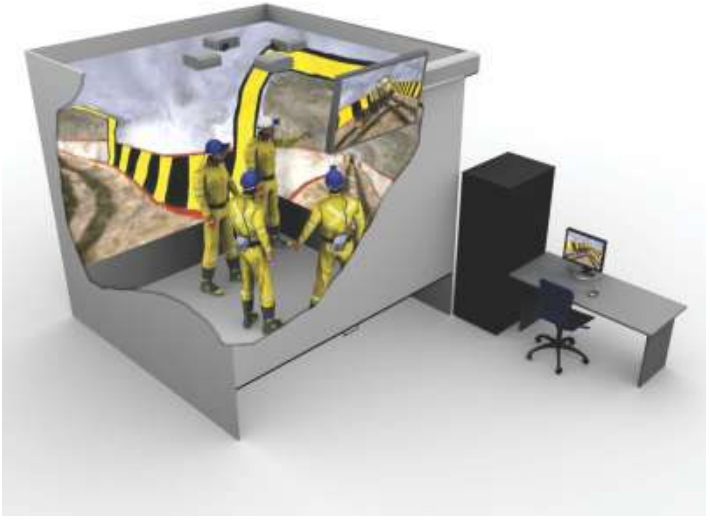
CBT Systems are ideal for teaching the following:

- Walk-around inspections (pre-shift and post-shift)
- Vehicle/Machine terminology (e.g. parts and functions)
- Standard operating procedures (SOPs)
- Guidelines, rules, regulations and safety measures
- Machine safety (e.g. machine blind spots)
- Accident and incident reporting
- Lockout procedures



VISUALIZERS

OVERVIEW



The purpose of a Visualizer is to enable users to visualize the processes and activities on a worksite.

Users get the opportunity to interactively manage a worksite. This develops their management skills in a safe and controlled environment.

Visualizer training generally develops the *Knowledge* and *Supervisory Skills* of a trainee, specifically focused at big picture understanding.

This package is aimed at mine section or site managers. It may however be used equally effective for the training and induction of machine operators, site managers and administrators.

The visualiser gives users a holistic view of the process and enables them to see where a specific machine fits into the overall process.

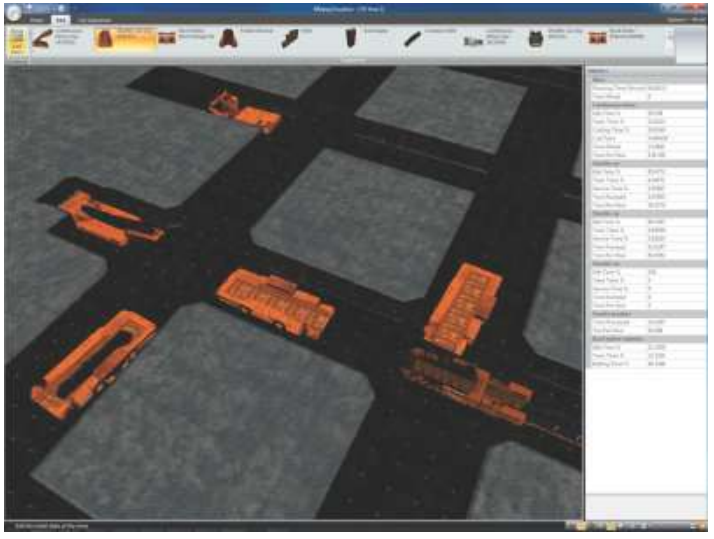
Visualizations may be viewed with any of the following hardware, as shown above and to the right:

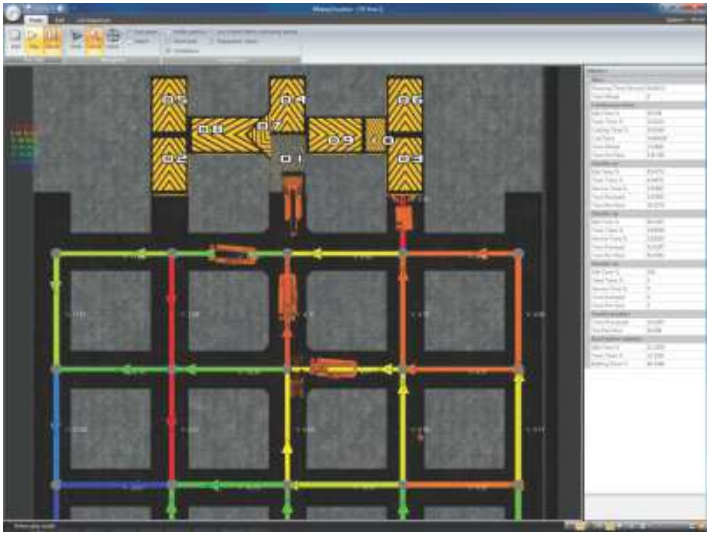
- Large LCD Screen
- Cube-Type Simulator Base System
- 120° Visualization Studio
- 360° Visualization Studio

Benefits:

- Training tool
- Planning tool
- Optimization tool
- Production management tool
- Orientation tool

MineVIZ™ Underground Coal





The purpose of the 5DT Underground Coal Mining Visualizer (MineVIZ™ - UG Coal) is to enable users to visualize the processes and activities in an underground coal mining section.

Users get the opportunity to interactively manage an underground coal mining section. This develops their management skills in a safe and controlled environment.

This package is aimed at underground coal mine section managers. It may however be used equally effectively for the training and induction of machine operators, mine managers and administrators.

Benefits

- Training Tool
- Planning Tool
- Optimisation Tool
- Production Management Tool
- Orientation Tool

It is possible to set up a virtual mine with one continuous miner and two shuttle cars and let the process run its course for a specific time-period. One could then increase the number of shuttle cars and perform another run. The outcomes of the different runs (measured in tons of coal produced per time period) could then be compared with each other.

In terms of the operational use of the system one could set up the virtual mine according to the plan of an existing mine and with the same number and type of machines. The system could then be used for planning, briefing and debriefing (feedback) purposes.

The total system consists of the system software, a high performance notebook computer and a large screen display for classroom viewing.

MineVIZ™ UG Coal Program Modes:

- Edit a Mine Section (Setting up the virtual mine)
- Edit a Scenario (Setting up the virtual machines in the virtual mine)
- Run a Scenario (Pre-programmed mode)
- Control a Scenario (Interactive mode)

MineVIZ™ UG Coal Features:

- Active indicators: Time and Production (tons of coal mined)
- Visualization can be run in normal, accelerated or decelerated time
- Transparency view (look through rock to see what is hidden)
- Ventilation view (air/gas flow is continuously calculated)
- Hazards view (illuminated hazards in the workplace)
- Static viewpoints (e.g. at coal face or at feeder-breaker)
- Dynamic viewpoints (e.g. driving on-board a shuttle car)
- Viewpoint navigation with computer mouse
- Cut sequences may be programmed
- Artificial intelligence (AI) machines

MineVIZ™ UNDERGROUND HARD ROCK

This visualization shows a multi-level underground hard rock mine with inclines, machines and ore shoots. Artificial intelligence (AI) machines are programmed to perform certain tasks in a circuit. The user can view the entire mine to see how everything is happening. The user can also zoom in on specific processes by jumping to that location or by navigating him/herself to that position with a space controller like a computer mouse.

Features:

- Supervisor / shift boss management training
- Artificial intelligence (AI) machines
- Jump to static viewpoints
- Jump to dynamic viewpoints (outside or inside machines)
- Viewpoint navigation
- Visualization can be run in normal, accelerated or decelerated time

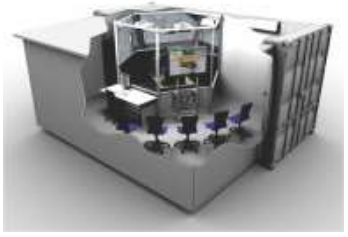
MineVIZ™ SURFACE MINING

This visualizer allows the user to experience the operation of a surface mine. A shovel with a circuit of 10 haul trucks is set up. The haul trucks are spaced all over the circuit. The scenario is then started. The user can view activities at the shovel where ore is loaded on the trucks, or he/she can take a ride in one of the haul trucks on its way to the crusher. The user can then jump to the crusher and see how another haul truck is dumping its load there.

Features:

- Supervisor / shift boss management training
- Artificial intelligence (AI) control of machines
- Jump to static viewpoints
- Jump to dynamic viewpoints (outside or inside machines)
- Viewpoint navigation
- Visualization can be run in normal, accelerated or decelerated time

OVERVIEW



5DT's Simulator Base systems (SimBASEs™) can be mounted inside a classroom (building) or can be mobilized.

The 5DT Mobile Solutions are based on High-Cube ISO shipping containers. These containers are 300mm (1') higher than standard ISO containers.

5DT also offers a dual-size fold-out container that doubles the available floor space when deployed. The increased height and floor space lead to user comfort that sharply contrasts with the cramped mobile solutions offered by conventional simulator suppliers.

The containers may be transported with dedicated container trucks or with 5DT's container trailer solution. When using the trailer, the container can be left on the trailer permanently or it can be removed from the trailer at the target site. The trailer can then be used elsewhere.

The containers may also be attached (by means of container locks) onto a truck. This solution provides for very rapid deployment and deployment over difficult road conditions.

General Features for all 5DT Mobile Solutions:

(*Specific* Features are shown with the individual solutions)

- Modular, standardised and turn-key solution
- High-Cube ISO containers are used (some applications require that machine operators stand upright on motion base)
- Eco-friendly (recycling of shipping containers and use of low-energy lights)
- Rugged and secure
- Fully insulated
- Air conditioned (cooling and heating)
- Non-slip flooring
- Anti lock-in for occupants
- Waterproof
- Emergency lighting
- Fire extinguisher
- Whiteboard for instructor
- Electrical distribution board

SINGLE CONTAINER

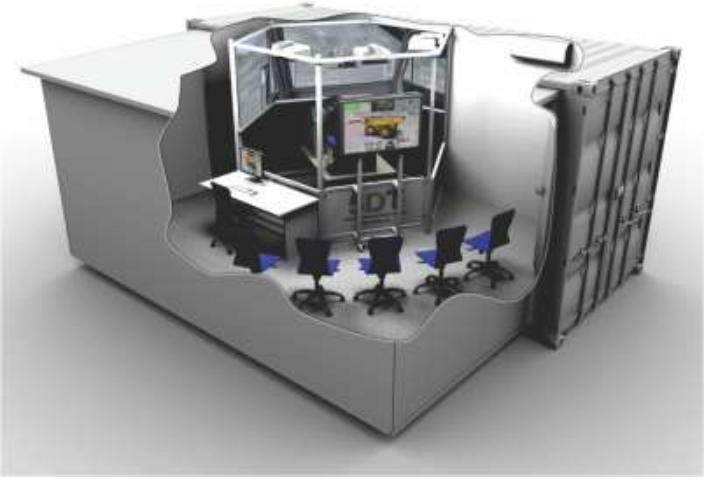
The single container is 5DT's mobile workhorse. 5DT applied ergonomic design principles to ensure that there is *as much as possible free floor space* inside the container. The single container is ideal for housing the 5DT Cube-Type Simulator Base System.

Specific Features:

(*General* Features are shown under Mobile Solutions Overview)

- Motorized roll-down rear screen
- Space for other class members

DUAL-SIZE FOLD-OUT CONTAINER



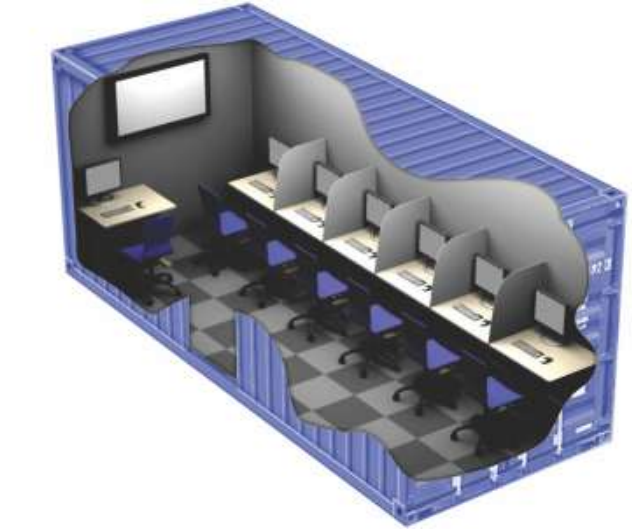
A single container folds out to form a dual container space.

Specific Features:

(*General* Features are shown under Mobile Solutions Overview)

- Almost double the floor space of a single container
- Deployed by two persons in less than 1 hour
- May be shipped via a container ship, railcar or road truck

CLASSROOM CONTAINER



The objective of the classroom container is to provide a mobile computer based training (CBT) classroom. A classroom consisting of one instructor desk and six operator desks are mounted in a single or dual-size container.

Specific Features:

(*General* Features are shown under Mobile Solutions Overview)

- Privacy dividers or cubicle dividers between trainees
- Separate instructor station
- Large LCD classroom screen
- Storage cabinet for manuals
- Classroom whiteboard
- All computers are networked

TRAILER

The 5DT trailer solution is essentially a trailer to which a container (either single or dual-size fold-out) is attached with container locks. The trailer may be deployed with the container or the container may be off-loaded so that the trailer may be used elsewhere.

Specific Features:

(*General* Features are shown under Mobile Solutions Overview)

- Trailer weight, including container and simulator: 4,500 kg (9,900 lbs)
- May be towed by most commercial tow vehicles
- Tow ring coupling
- Deployable in less than one hour
- Optional lift gate

SUPPORT

Our simulators are designed with availability in mind from the ground up, where availability is a function of reliability and maintainability. We choose the most reliable parts, sub-systems and designs. We also design our simulators so they can be maintained easily and effectively.

A 3-year support plan is strongly recommended. The plan may also be extended to 5 years.

The support plan includes the following:

- Warranty extension to 3 years
- Two (2) preventative (planned) site visits per year
- Two (2) corrective (unplanned) site visits per year
- 5DT Train-the-Trainer (T3) program for instructors
- All parts, labor, travel and accommodation costs
- Free software upgrades
- Free documentation upgrades

Support is generally provided progressively as follows:

- Telephone and E-mail Support
- Internet or Modem Support
- On-Site Support

Emergency spares for the systems are kept on site to ensure that it can be serviced quickly and efficiently.

We make operators Safer, more Productive and less Destructive! ™

www.5DT.com