Survey Management System

RE-CALCULATION MACRO FOR SURVEY TRAVERSE LEDGERS

SURV-GEN-20030715

Revision: draft B

Document Owner OLIVER GLOCKNER - CONTRACT MINE SURVEYOR						
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1 PURPOSE

This procedure describes a macro that has been made up to enable the re-calculation of survey station coordinates within a traverse ledger, to be more easily performed.

2 SCOPE

This document applies to general mine surveying, and SSI v4.1 software.



3 DEFINITIONS

Traverse Ledger

Listing of survey traverse station details.

The document displays the most up to date coordinates, based off original surveys, resurveys, recalcs, and other check surveys such as gyro readings.

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85	oc	PS	LEVEL	AT	FVDERG	HD	Y	X	z	DATE	85	oc	PS	AT	FWD BRIG	HD	Y	×	- 2	COMMENTS: DATE, DIFFERENCES, GTRO, ETC.	dcity N	dulto
								billion and														
COME	COM	C0121	340	232,1931	117.4429	58,328	3401,267	58588.0%	843,876	20/05/1995	COULT	COMP	CD121	351,5530	177,5029	58,316	3401,110	55558,011	544,011	RESURVETED INSMS	-0.151	-0.00
CDMS CDMS	COUN	34001	340	93.4935 88.2705	51,3400 81,784	25.560	3408.58F	53625,334 58625,830	943,703 843,703	12106/1995		COUNT			31.4000 81,1134		3406 326	53685.566		RECALC MIT/03 JOB/035	-0.204 -0.204	-0.00
COM	30,000		360	22.1411	250,45%	5,702	2400.501	53620,307	263,365	20/05/1300	_	34,000			2335410	_	3408,383	59625,821		RECALC MINOS JOBIOSS	-0.004	-0.00
CONT		34002F	341	4.1459	275,4901	5,229	8407,050	59620,722	343,719	28/05/1998	_	84007	84002F		275,35 01		3416,865	59620,717		RECALC 1417/03 ADB1038	0.125	-0.00
CDM	34000	24003	260	50.3146	4.0556	52.351	3430,756	55620,236	905,604	20/05/1990		34001	24003		4.1056	_	9426,590	53520.207		RECALC HITMO3 JOBNO35	-0.216	0.05
Secon	84903	340038	343	88.0613	264,1208	242	3438 554	58625.836	943.801	25/07/1998		34900	840038		254,7938		8438.851	58625,887		RECALC 1417/03 JDB1038	-0.203	0.05
COM	54000	34004	960	260,2520		16,316	5552,725	55640.011	240,275	25/10/1995		34000	54004		165.2545		5332,540	55610.041		RECALC MIT/03 JDB/035	-0.185	-0.00
CORR	84902	34004F	340	214,0912	188,0035	15.105	8382,726	59620 704	343.444	\$8/10/1898		34902	34864F		180.0627		3092532	\$3620,675		RECALC 1417/03 J0B1038	-0.194	-0.02
come	36000		560	174,0014	56,1222	15,162	2407.401	59609,058	345,054	14100/1555	20.09	COUNT		52,0115	65.5162	40.025	5607,207	\$95.50,005	545,246	RESURVEYED \$(2/0)	-0.154	-0.02
CORST		34005B	340	168,433	80,2338	10,073	34(8,211	58635,856	844,709	14187/1989		84007			80.2898		3497,930	59635.853		RECALC 1417/00 JDB1024	-0.221	-0.00
560007	340007		560	189,5401	104,2121	22.55	5401711	55661252	345.64T	25/07/1555		56005			104.2135		940L5I5	59651,265		RECALC MIT/01 JDB/034	-0.196	-0.02
34002	,84,090°		340	183,2306	97.9027	22,443	9404.333	59561291	846,525	29/07/1999		84000			37,5044	_	3414,143	59651263		RECALC 1417/03 J081034	-0.196	-0.08
54005	54005	34001	560	H6.2853	100.5014	15,116	9396,756	55616,125	245,160	\$40511555	_	54008 84007	54001		100.5032		9026,555	59676,705		RECALO 1417/03 JD51034	-0.156 -0.158	-0.02
34006	.94007	34007F	340	183 4017	104 3031	7.243	3336,341	59589,741	345.861	15/08/1959			34007F		904.3043	-	3336,743	59693,718		RECALC 14/7/03 JOB1034		-0.08
SAGOTE	94008	34008F	340	252,5109	4,5054	35.974	3434.515	59664,014	945,388	13106/1993		34008	34000F		4,5112		9404.58	53564.054 53664.064		RECALC MIT/03 JOB/034 RECALC MIT/03 JOB/034	-0.196	-0.020
540035	34007	34003	360	10.46	25,046	11,104	5555,255	55693,656	242,662	28/00/1999	coar	54005		191,5938	101,512	55,712	9396,019	59500.524	545,661	RETURNETED S(200)	-0.219	-0.05
949050	84,007	24003F	940	191,3305	104.0435	97,000	3304.477	\$35.00.105	345.004	20/03/11222	20001	84,007		1000000	104 3301	2010	3334 PB6	53630,164	242.0001	RECALC 16/7/03 J08/035	-0.131	-0.02
MODE		14003F		192,2961	111.5935	3,426	9395,015	59696,832	345,665	25106/1899			94003F2		112,0204		9324,784	59696,801		RECALC MITAGO JOS 1035	-0.221	-0.03
34006	.040000	34911	340	100 2557	119,5540	10,027	2001.064	\$3790.005	345.949	4/10/1993		-04900			#12.501D		3316,732	50710.050		RECALC 1417/00 J001005	-0.212	-0.000
34008	54007	54011F	340	186,7620	105.4602	18.023	8351,401	59111.000	345,558	4/10/1999		54005			105,4833		5591.159	59110,356		RECALC MINOS ADBIOSS	-0.232	-0.05
34006	24000	3401271	340	101.04.00	110.0412	34.647	2004.054	59786.889	346.741	4/10/1003		24900	3401251		110,0640		9303.018	53726 841		RDCALC (417/03 JDD1035	-0.848	-0.04
340008	54007	34012	341	194,2059	TIS.5542	35.682	9381845	59126,260	545,885	4/10/1999		34009	34012		103,5612		8381,602	59 (28.238		RECALC 1417/03 JDB1035	-0.243	-0.043
54000	24002	3401252	340	136 (563)	110.4519	30,330	3300 540	53293,235	345,003	4/10/1003		24900	3401252		113.4002		2010.065	53723,952		RECALC 1617/03 J001035	-0.245	-0.04:
5400	54002	34013	340	64,1924	358,1750	27,398	9409,641	59 (25,337)	340,065	THURSS		84017			359.2023		3408,538	5 8125 815		RECALC 1417/03 J/081035	-0.243	0.02
2400	34015	34013F	360	100,4540	0.0000	4150	3410,374	59725,941	345.364	-filloutada		50000	34013F		0.0641		3413,734	50795.000		RECALC MITMO JOBNOS	-0.245	-0.013
34008	340TF	34014	340	75,3845	0.0248	38,400	8428,864	59111.027	945,862	2010/1888		JATOTT	34014		0.0521	_	8428,132	5 8 7 11 0 2 0		RECALC 14/7/03 JOB1035	-0.232	0.00
30.00	300W	34054F	360	100.0051	0.0000	2.157	2430,581	50111.008	946,050	28404000		34000	34014F		0.0642		2450 200	557H 025		RECALC (4)7/03 JDB/036	-0.232	-0.000
24002	340E	34015	340	105.2120	105 4510	4.045	9372,250 9370,750	59760.261 59764.010	946,529 946,570	2000335		84012 3405	34015		105.4143	_	9371.991	53763.560		RECALC 1417/03 J05/036 RECALC 1417/03 J05/036	-0.258	-0.048
8400		34015F3		276,0319	2014828	4.058	8368.493	5975 8,754	841542	10/11/1889	_	3400	34015F3		2015102		3358,225	59758,102		RECALC MINOS JOBIOSE	-0.258	-0.053
34,011	34000		260	179.5539	259,5030	42.000	9475.621	53791.014	345.423	7111/12/20		34000			0.0103		9475,969	557H.042		RECALC HIT/03 JOB/036	-0.232	0.020
84011	34004	34016F	343	183,4832	3 522 6	42.206	3475,520	\$9713.684	846.743	1111/1388	_	34000			3.9501		3475.335	58713.812		RECALC 1417/03 JOB1036	-0.234	0.026
360W	36042	3491T	560	175,5007	110,5203	40.510	9967,484	59753,950	567.89	25/12/1995		36017	SADIT		110,5406		5067,213	59760,501		RECALC HIT/03 JOB/036	-0.271	-0.052
8400	84020	SABITE	340	113.3585	108,3420	39.144	3363182	58253,354	841.647	38/12/1889		84025	34017		108.3654		9968.9%	\$9763,903		RECALC (417/03 JDB1036	-0.272	-0.05
54012	340 F	34015	560	175.94.25	107.0625	20.507	9051.451	59760.552	247,724	25/12/1555		340m	34018		90T.0902		5061186	59762.495		RECALC MIT/03 JDB/036	-0.285	-0.056
34372	3400	340188	940	178,0413	108 5516	19.647	3361442	59781,962	841,435	86424999		SMOTT	340188		109.5949		336158	59781506		RECALC 1417/03 J0B1036	-0.284	-0.056
54012	3400	34013	540	54,5504	055.4107	46,545	3414.300	59750,500	541.025	20/01/2000	3400	340T	34013	04.5453	355,4656	46,341	9414,504	59160,500	545,525	REGURVEYED (MO2/00	0.004	-0.000
								1 1000000000000000000000000000000000000		1000000	2000	SHOW	34013		355.4323		9414.005	\$9760.483		RECALC 1417/03 J 091036	-0.265	-0.020
54012	3400	34013F	340	50,5019	0.4222	41,205	2414,555	55764.535	241.092	2110112000	340/2	MUTT	34015F	655024	0.4227	47.215	54.0.657	55164,536	345.335	RESURVEYED (MOZICO	0.008	0.001
												-3400	34013F		0.4500		9414.425	59754,519		RECALC 1417/03 J081036	-0.253	-0.016
54012	3400	34020	360	II 8.484T	110,4051	5.453	9562,027	59178,410	347.185	2110112000	84012	34000 34000	34020	119/4505	110,4936	B.403	8362-045 9361766	\$3770,003	541,015	RECURVEYED (MOZICO) RECALC (417/03 JOB4036	-0.864	-0.045
54012	Mar	94920F	347	111.4206	102,5439	14.830	9364.255	SSITE-AZE	841 588	2110112000	94972	MOT	54920F	1014125	102-3528	14,758		59174,365	541,231	RESURVEYED INVOSION	0.013	-0.040
	04000	*******	***	111.46.25	Page 100	m.cov.	2,000,000	Serinoral	241.000	- IIIIII	- vene		34920F	III Service	108,3648	PLUM	3363,386	59770.003	341201	RECALC MINNS JORNOS	-0.260	-0.000
5600	54020	34021	840	P0.1052	0.5036	38,256	8400.340	59175,929	841,295	10/02/2000					100.000	1	01000100	301 - 300 -		Tacanto Mantos Postario		. 0.00
94.057	200000	3402W	341	70.0714	0.4710	41.0%	9403.059	\$2770.292	247.472	10/08/2000												
34000	34921	94022	340	T18.081F	356,5857	51,513	3452.181	59176,195	345,645	25/05/2000												
24065		34022F	340	1085040	353 5342	4.060	2455.544	59776.493	343.210	25/00/2000												
84927		94923B		335,0846	66,0758	8,124	5444,202	59715,126	845.31	5104/2000												
24085		24024	340	81,2523	362,3756	15.600	2442 (53	55754.236	240 248	10/04/2000			-									
84927	849208		341	37,4544	278.4912	15,682	8445,605	55154,225	848,661	10/04/2000												_
36000	200000		360	57.0047	353.544.3	29.384	3473.586	59779.464	340.357	3/05/2000												-
M0038	84035	34025F	340	105,2914	286,0057	4.824	3474, 517	59714.847	349,025	3/03/2010								-				-
34021	84028	34026	360	23.4730	34.5606	60.572	5350.765	558622.616	540.701	21105/2000										+		-
34000 34000	24026	340267	340	175.2518	90,0324	10.522	9358,165	55025.615	348,335	15/06/2000						_				1	_	1
STORE	84012	34027F	340	85.5446	359.5047	8 107	8066,259	58828,403	948 397	27/06/2000												_
56520	36027	34020F	360	85,0146	359,2936	45,984	2404.124	50025,003	349,205	4/07/2000						_					_	_
34000	84007	34028	940	65 0553	359,2146	41.207	3401358	58828.004	349.069	4/07/2010												
SWOATE	SWOULS		360	357,3504	116,5650	3,653	9031,713	55020,510	340.73	14/07/2000												
SECOND		34823F	340	15,1700	194,3806	9.364	8381,718	58826 487	848,778	14/0712000												

Original Surveys

Check Surveys

4 PROCEDURE

THE SURVEY TRAVERSE LEDGER

A Traverse Ledger will typically display originals survey data in columns such as:

| BS | OC stn from | FS new stn | LEVEL | Angle Turned | FWD BRG | Hz Dist | Y | X | Z | DATE |

Next to this is often all the check and re-calculation surveys and comments regarding the station:

| BS | OC | FS | LEVEL | AT | FWD BRG | HD | Y | X | Z | COMMENTS | delta N | delta E |

The macro is an aid to calculating the second part of the ledger.

The Leica has the ability to have the vertical angle continuously updated, or stay fixed after a distance measurement.

THE TCL MACRO

This macro is for Surpac v4.1 Surveying Module

The purpose of the macro is to easily be able to recalculate station coordinates in an underground survey traverse ledger.

This is especially the case when a resurvey only uses a few stations, and all others not part of the resurvey, need to be recalculated.

The macro provides a keyboard entry of this data, creating an .inp file, as if it were done with a Geodat 600 data recorder.

CAUTION: The macro does not do heights, any RLs calculated are false.

Run the macro entering the data, and a .inp file will be generated.

CAUTION: Copy or create a new dummy database to do the recalcs - avoid using an actual control database.

Process the .inp as if it were a Geodat 600 input file.

The .inp file will be in the format:

```
50=
          (job name and number)
2=
          (station occupied)
3=0
          (false instrument height)
          (back-sight station)
62=
21=0.0000
             (false bs reading)
          (point number from 1 to ...)
5=
          (horizontal distance)
9=
             (false vertical angle)
8=90.0000
          (angle turned)
7=
6=0
          (false target height)
              (forward station, where abc is name)
4=STNabc
loop back to 2= for every input station
```

CAUTION: Author takes no responsibly for any damage that may unintentionally be caused through its use.

5 REFERENCES

Surpac Help Notes	Surveying – geodat.htm						
Example Traverse Ledger	ug survey traverse ledger.xls						
DOME WA Safety Bulletin #57 dated 10/11/200	Mine Surveying – Risks in Loss of Accuracy and Integrity.htm						

6 DOCUMENT REVISION HISTORY

Revision Events						
Rev.	Author	Changes	Date			
Draft A	OG	Initial draft	15/07/03			
Draft B	OG	DOME WA Safety Bulletin #57 dated 10/11/2000	15/07/03			

7 APPENDICES

```
# keyboard_traverse_recalc_input.tcl
             O.Glockner Date: 14/07/2003
# Author:
# Direction by;
                 O.Glockner
#
  Introduction
#
#
  This macro is for Surpac v4.1 Surveying Module
# The purpose of the macro is to easily be able to recalculate station coordinates in an
# underground survey traverse ledger.
# This is especially the case when a resurvey only uses a few stations,
# and all others not part of the resurvey, need to be recalculated.
# This macro provides a keyboard entry of this data, creating an .inp file,
# as if it were done with a Geodat 600 data recorder.
#
  CAUTION: The macro does not do heights, any RLs calculated are false.
# Run the macro entering the data, and a .inp file will be generated.
  CAUTION: Copy or create a new dummy database to do the recalcs - avoid using an actual control database.
# Process the .inp as if it were a Geodat 600 input file.
#
  The .inp file will be in the format:
#
  50=
#
             (job name and number)
# 2=
            (station occupied)
# 3=0
             (false instrument height)
# 62=
             (back-sight station)
# 21=0.0000 (false bs reading)
#
  5=
            (point number from 1 to ...)
# 9=
            (horizontal distance)
# 8=90.0000 (false vertical angle)
# 7=
            (angle turned)
# 6=0
             (false target height)
# 4=STNabc (forward station, where abc is name)
#
  loop back to 2= for every input station
#
#
  This macro is Beerware, absolutely free for use.
  If you are so fascinated by it, or find it very useful, and want to pay for it (or even if you don't),
#
  you are encouraged you to buy the production team a beer (or twenty four) when you next meet them.
  Standard disclaimer
#
# This program is distributed as beerware. This software is provided "as is",
  without any guarantee made as to its suitability or fitness for any particular use.
# It may contain bugs, so use of this tool is at your own risk.
# Author takes no responsibity for any damage that may unintentionally
# be caused through its use.
```

Form Definition for entering file names

```
set form {
 GuidoForm sampleform {
   -default buttons
   -label "Keyboard Traverse Recalc-Station Geodat 600 .inp File Creator Macro V1.01"
   -help geodat.htm
   -layout CentreLineLayout vertical Left
   GuidoField writefilename {
      -display_length 26
     -format none
     -label "File to Create - Loc"
     -legacy_action
     -max_length 252
      -translate none
   GuidoField writefile_id {
     -display_length 6
     -format integer
     -label "Job Number - File ID"
     -legacy_action
     -max_length 32
      -null false
      -translate none
   }
 }
# Creates form in memory
SclCreateGuidoForm form_handle $form {
}
# display the form
$form_handle ScIRun {}
if {"$_status" == "cancel"} {
puts "Macro Cancelled"
 return
}
#Enter Recalc Details
set writeFile [open "$writefilename$writefile_id.inp" "w"]
# write the header lines to the string file
puts $writeFile "50=$writefilename$writefile_id"
set form2 {
 GuidoForm sampleform {
   -default_buttons
   -label "Traverse Ledger recalc details"
   -help_url geodat.htm
   -layout BoxLayout Y_AXIS
   GuidoScrollPane resectionScrollPane {
      -border etched true
      -height 10
```

```
GuidoTable resectionTable {
        -instances 1 1 999
        -interactive true
        GuidoField bs {
           -display_length 16
           -format none
           -label "BS Stn"
           -translate upper
        GuidoField oc {
           -display_length 16
           -format none
           -label "Occ Stn"
           -translate upper
        GuidoField fs {
           -display_length 16
           -format none
           -label "FS Stn"
           -translate upper
        GuidoField at {
           -display_length 16
           -format float
           -label "Angle Turned"
           -translate lower
        GuidoField hd {
           -display_length 16
           -format float
           -label "Horiz Dist"
           -translate lower
      }
   GuidoPanel warning {
      -layout BoxLayout Y_AXIS
      GuidoFiller warning1 {
        -height 0.5
      GuidoLabel warning2 {
        -label " This macro creates a Geodimeter style .inp file, which can then be processed using SSI v4.1, as
if it were done with a Geodat 600 data recorder."
      GuidoFiller warning3 {
         -height 0.5
      GuidoFiller warning6 {
         -height 0.5
      GuidoLabel warning7 {
```

```
-label "Enter angle data as degrees.minutesseconds (e.g. 207 27 57 as 207.2757)"
      GuidoFiller warning8 {
        -height 0.5
      GuidoFiller warning10 {
        -height 0.5
      GuidoLabel warning11 {
        -label " Ensure there is not a blank line at the end of the table"
      GuidoFiller warning12 {
        -height 0.5
   }
}
ScICreateGuidoForm form_handle $form2 {
# display the form
$form_handle SclRun {}
if {"$_status" == "cancel"} {
 puts "Macro Cancelled"
 return
}
set numberStn [array size oc]
for {set i 0} {$i < $numberStn} {incr i} {
  puts $writeFile "2=$oc($i)"
  puts $writeFile "3=0"
  puts $writeFile "62=$bs($i)"
  puts $writeFile "21=0.0000"
  puts $writeFile "5=[expr {$i+1}]"
  puts $writeFile "9=$hd($i)"
  puts $writeFile "8=90.0000"
  puts $writeFile "7=$at($i)"
  puts $writeFile "6=0"
  puts $writeFile "4=STN$fs($i)"
# close the new file
close $writeFile
# Tell people what to do
puts "
puts ""
puts "Created Geodimeter traverse recalc file $writefilename$writefile_id.inp"
puts "Refresh work directory to view results file" puts "-*-*-*-*-*-*-*-*-*-*-*-*-
```



DEPARTMENT OF MINERALS AND ENERGY WESTERN AUSTRALIA Safety Bulletin

No:	57
Date:	10/11/2000
Subject:	MINE SURVEYING - RISKS IN LOSS OF ACCURACY AND INTEGRITY

Details:

BACKGROUND

The maintenance of accuracy and integrity in carrying out mine survey work and in preparation, maintenance and checking of plans is of paramount importance in relation to the safety and efficiency of operations.

This is particularly the case for underground mines, but is also of importance in surface mines, in open pit wall stability monitoring, in open pits intersecting old underground workings, and surface controls over existing underground workings.

The history of mining disasters includes a number of inrushes into underground mines, and also cases of subsidence and collapse into workings, where deficiencies in surveying, or in maintenance and interpretation of plans were factors.

The most recent such event in Australia was at Gretley Colliery in NSW in 1996.

In some measure, a factor which has contributed to an identified decline in performance standards has been the evolution of semi-automated electronic surveying equipment (total station etc) which, while it affords great efficiency and convenience, can lead to oversights and errors which were more readily checked on and detected with the earlier more simple and document based procedures.

However the problem goes deeper than this. In part it stems from lack of in-depth training in some fundamental sound practices. In some cases turnover of staff and lack of continuity at handover, as well as Long Distance Commute regular handovers, creates the opportunity for oversights.

ISSUES AND DEFICIENCIES IDENTIFIED

Surveying Professionals on the Mines Survey Board have advised of a range of deficiencies from their own experience and that of colleagues in carrying out contract and check surveying at mines in Western Australia.

These problems are not normally found at the larger (and longer term) established operations, but are often readily identified at smaller mines, which may also be a function of lack of resources, and of mentoring by experienced survey professionals.

Commonly found deficiencies and oversights are listed as dot points.

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Survey Practice

- In most cases there is a lack of hard copy records
- The Origin for coordinates and R.L. do not exist.
- There are no Traverse Sheets.
- There is no evidence that surveys are checked.
- There is no filing system.
 - No hard copy of survey procedures and standards is available. In some cases no procedures and standards are observed.
 - A lack of basic fundamentals in regard to underground surveying techniques is evident.
 - No evidence of re-traversing, plumbing down rises and spirit levelling was available.
 - Site plans are, as a rule not up to date.
 - Major surface control is not closed and balanced.

Shortfalls in Instrument Maintenance and Controls

- Instrument calibration and adjustment.
- Instrument service schedule 'up to date'.
- Prism constant calibration.
- Atmospheric calibration (ie, p.p.m. correct).
- Control registers up to date, closed and adjusted.
- Traverse equipment adjusted including optical zeniths and plummets.

This does not imply that there is any serious lack of competency in most persons carrying out survey work.

It does, however, show that controls and checks on standards of practice and verification of precision and integrity are lacking in some cases, and the process needs to be better managed, with adequate monitoring and mentoring by professionals with in-depth experience.

It is for these reasons that mine surveying remains a registered occupation (requiring statutory appointment) under the Mines Safety and Inspection Act 1994.

As an example, it is essential to have available a comprehensive and accurate set of current working plans available at underground mines at all times, so that should a mine emergency arise, plans for emergency response (mines rescue) teams are immediately available.

Cases have been found where the surveyor is away and the required information is stored electronically, in a computer not readily accessed.

RECOMMENDED ACTIONS

Registered Mine Managers and Authorised Mine Surveyors should thoroughly audit all aspects of surveying and plan preparation and maintenance at each mine.

The problem of running 'lean and mean', which has presented itself in a variety of forms at current mining operations, must not be allowed to put at risk the integrity of surveying upon which safety in mining operations depends.

Registered Managers should ensure that where an Authorised Surveyor is to leave an operation, the validation of all plans and records is ensured so that integrity is maintained at handover.

Failures and oversights can have and have had, catastrophic consequences.

This Safety Bulletin will be sent to the tertiary institutions providing training in surveying, to highlight the need for awareness and capacity in these critical functions.

Procedure

Re-Calc Macro for Survey Traverse Ledgers SURV-GEN-20030715

CONCLUSION

The Board has resolved that an audit of surveying functions and practices will be developed which can be added to the series of High Impact Function Audits carried out by the Department's mining inspectorate.

It is the intention of the inspectorate to progressively outplace auditing and the survey audit will certainly lend itself to being carried out by competent third party auditors.

To assist surveyors in the industry to achieve and maintain surveying standards the Board has proposed to develop a Guideline titled "Mine Surveying Standards and Procedures".

Following circulation of the draft to the professional surveying institutes, the Guideline will be provided to MOSHAB for endorsement and distribution.

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