A BEHAVIOURAL-BASED APPROACH TO IMPROVING SAFETY PERFORMANCE IN THE MINERALS INDUSTRY

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AIMS

- **Background of:**
  - *UK Quarrying Industry*
  - *Behavioural Safety*
    - *-what is it?*
    - *-why use it?*
    - *-does it work?*
- **Overview of:**
  - *Current Study (BSQ)*
  - *KPI Figures*

UK QUARRY INDUSTRY

- 3000 quarries in the UK, employing 35,000 workers
- 290 million tonnes/yr (approx 8% UK GDP)
- 20% growth of quarry products expected over next decade.

- Hazardous industry

  -HSE has reported it as having the highest rate of injuries of any industry (HSE, 06)

  -Hard Target

  -Human element (Peters et al, 1997; Geller et al, 2001; Maiti et a 2004; Galvin, 2005).

WHY FOCUS ON BEHAVIOUR?

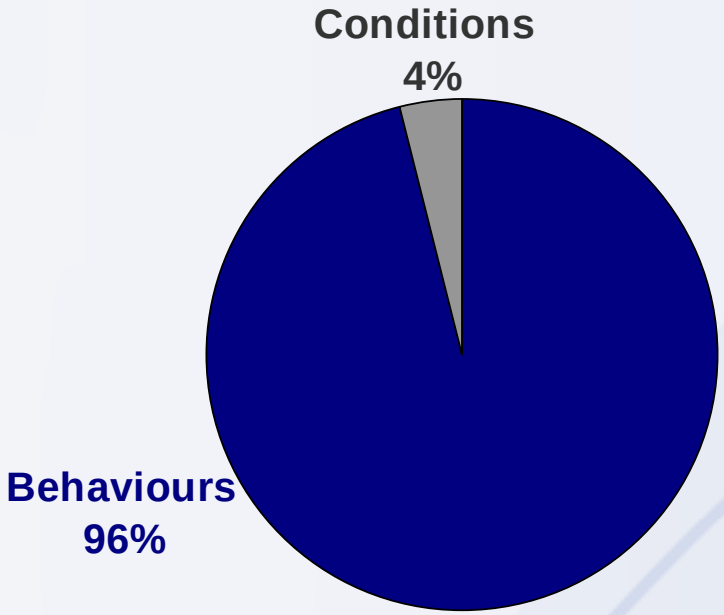


Figure 1 Pie Chart of Percentage of Behaviours & Conditions Attributed to Workplace Accidents

Figure 2 Heinrich's (1931) Accident Pyramid

- Most common injuries across quarry and mining sites:
  - manual handling
  - transport
  - falls from height
  - slips & trips

Behavioural-Based Safety (BBS)

Psychology of behaviour applied to reduce accident/injury at the workplace

Uses behavioural principles, such as:

-triggers
-consequences

} of the behaviour

Incentives, feedback and goal-setting

Can be bottom-Up
Use of Observations

Geller et al (2001) 'DO IT'

Define
Observe
Intervene
Test

DOES IT WORK IN PRACTICE?

Success of BBS Across Industries

- McAfee and Winn (1989) - commercial organisations
- Guastello (1993) - “behavior modification techniques are potentially useful in many industries”.
- Krause et al (1999) - 73 BBS applications; paper, petroleum, chemical, and food

BBS Applied Research in the Minerals Industry

- US Mines -Fox et al (1987) -Rhoton (1980)
- US Quarry - Hickman and Geller (2003)
- S.Africa Mines -Talbot et al (1996); Schutte (1998);
- Australia Mines -Laurence (2005); Pitzer (2005)
- UK Mines -Simpson et al (1993)

The Unique Work Environment of the Quarry

- Small workforce; many lone workers.

- Lack of evaluative research of BBS with lone workers (Olson and Austin, 2001)

- Peer-reporting often described as vital to the BBS system (Krause, 2002)

- Self-observations.

  Support:

  -SSM approach.

  -Findings of self-monitoring improving safety performance as part of a BBS measure (Olson and Austin, 2001).

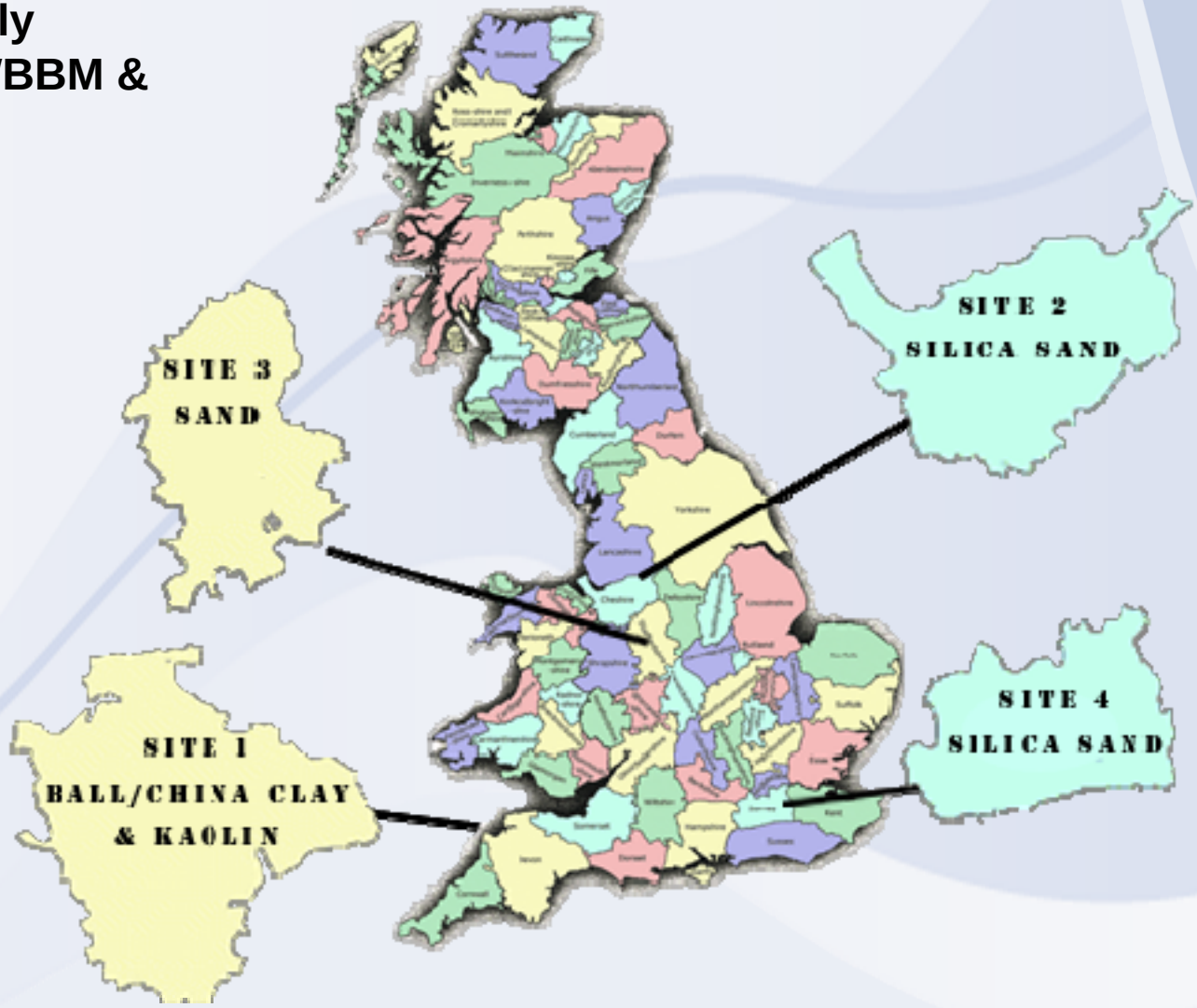
  -Endorsement from behavioural safety experts (Krause, 1997; McSween, 2003).

CURRENT STUDY

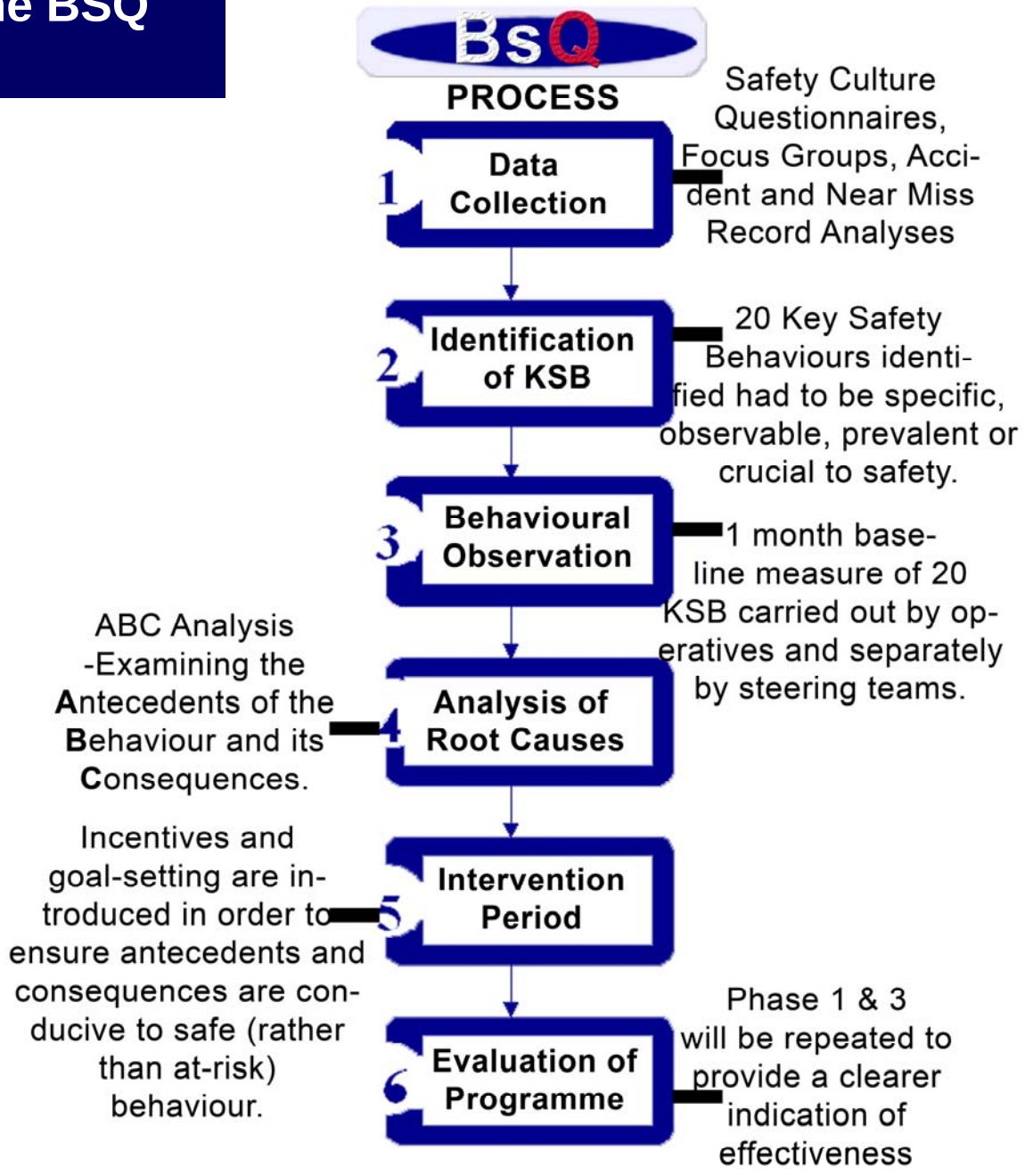
Funded by MIST initially
Currently funded by WBBM & EU Social Funds

OBJECTIVES

- **BSQ**
- **Common unsafe acts**
- **Root causes**

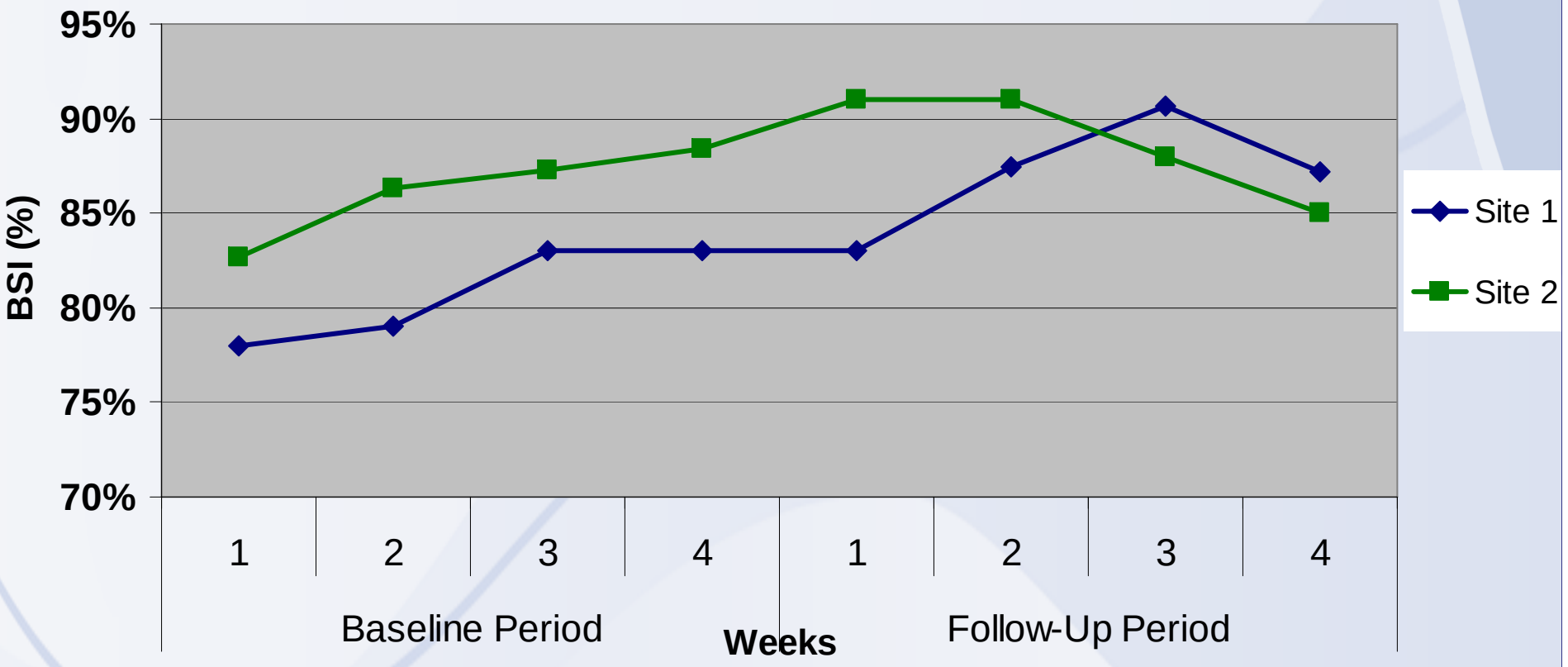


Phases of the BSQ Programme



KPI: Behavioural Safety Index

Figure 1. BSI % During Base-line & Follow-up

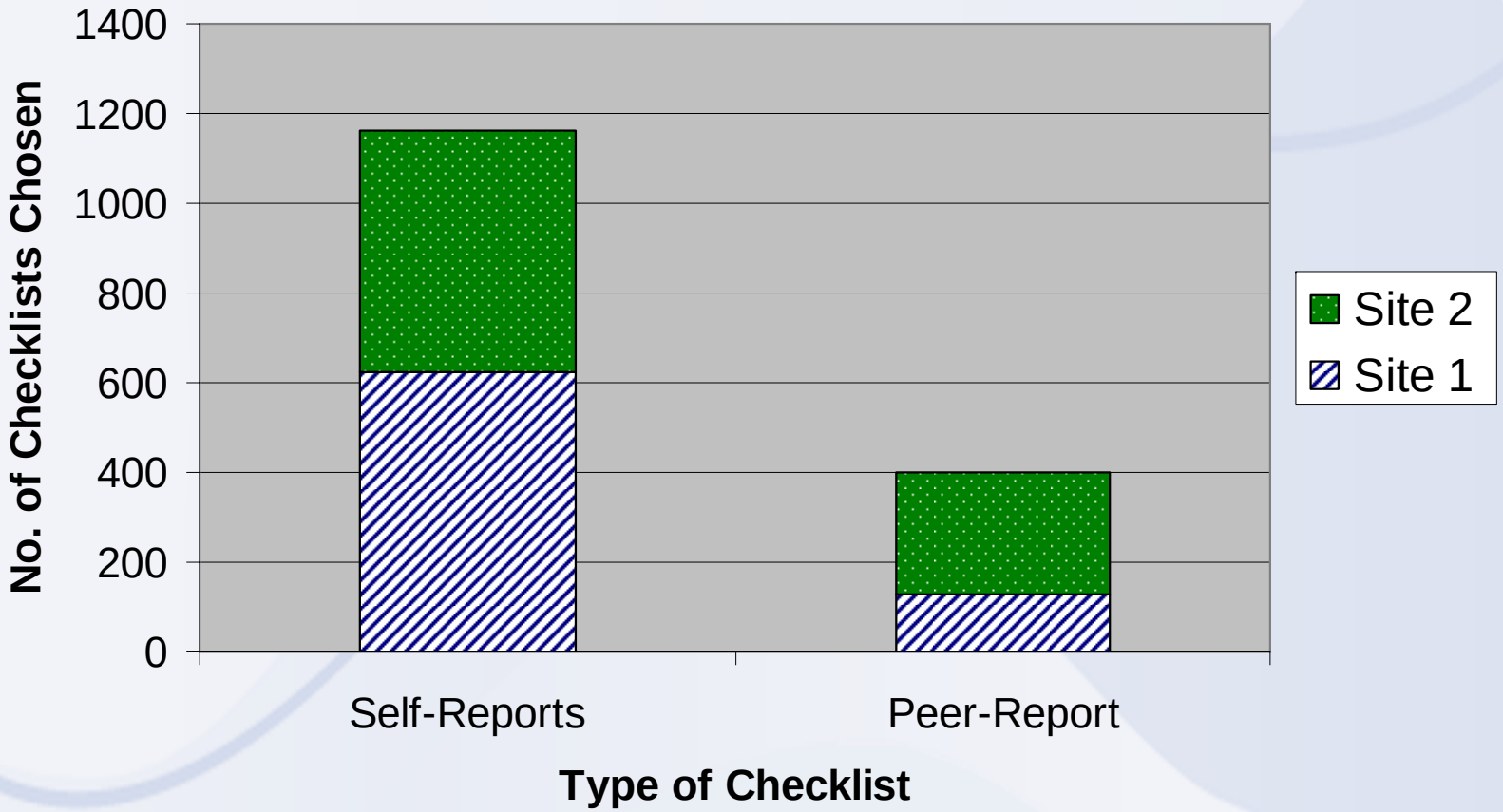


- BSI started to increase from the beginning of the baseline
- Hawthorne Effect
- social desirability bias
- Alvero and Austin's (2004)

- One month pre & post measure
- Good percentage of involvement

KPI: Behavioural Safety Index

Figure 2 Type of Checklist Chosen at Site 1 & 2 Over Two Months of Baseline and Follow-Up Periods



- self-observations well received & favoured over peer-reports.
- Supports the use of self-observations
- Self reporting more compatible method due to geographical or cultural issues?

KPI: Behavioural Safety Index

Figure 3: BSI by Checklist (BASELINE)

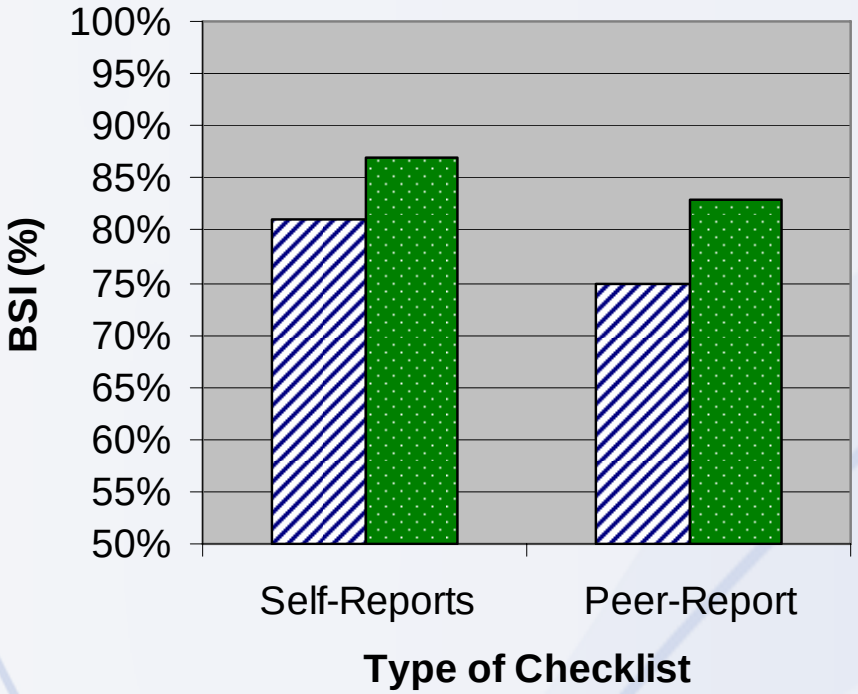
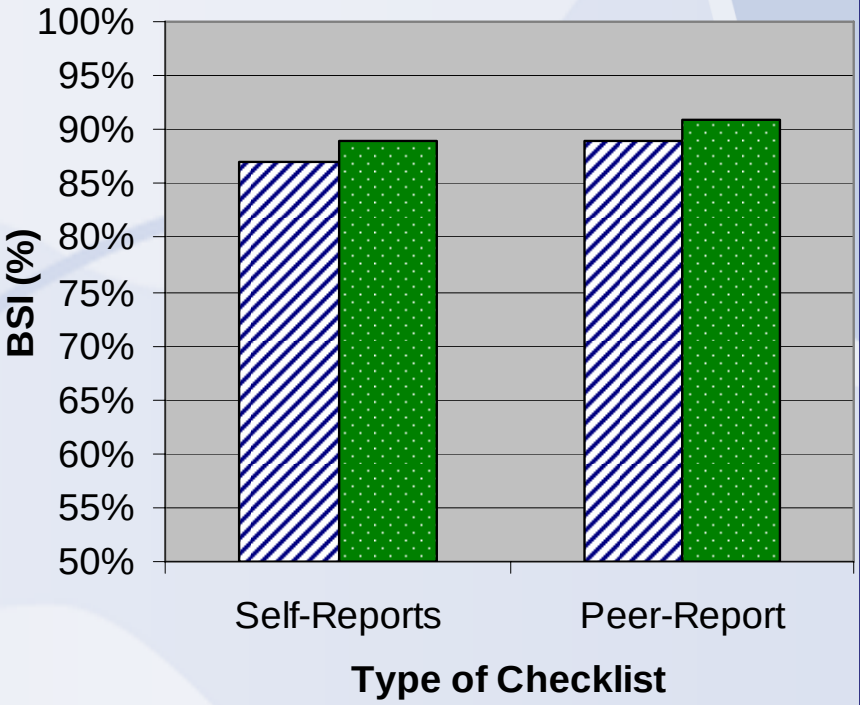


Figure 4: BSI by Checklist (FOLLOW UP)

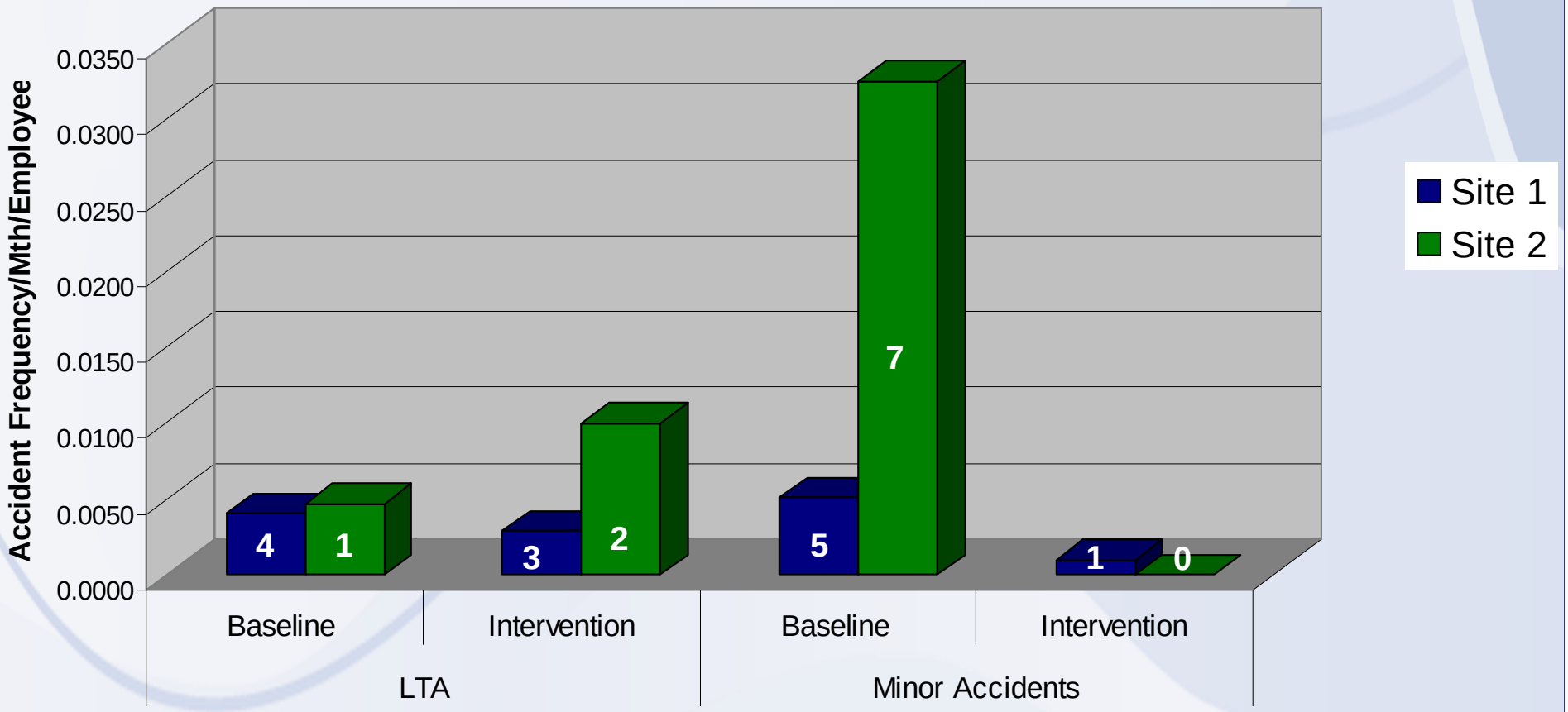


- Fig 3 self-reports have assessed a higher no. of safe acts compared with peer-reports.
- Attributable to:
  - -lack of self-awareness of own at-risk behaviours
  - -dishonesty in self-reports (self-serving/social-desirability bias)

- However, Fig 4 Peer-reports have assessed a higher no. of safe acts compared with self-reports.
- double-sided query on the levels of honesty of the self and peer reports.
- good level of honesty (14% at-risk acts)

KPI: ACCIDENT RECORDS

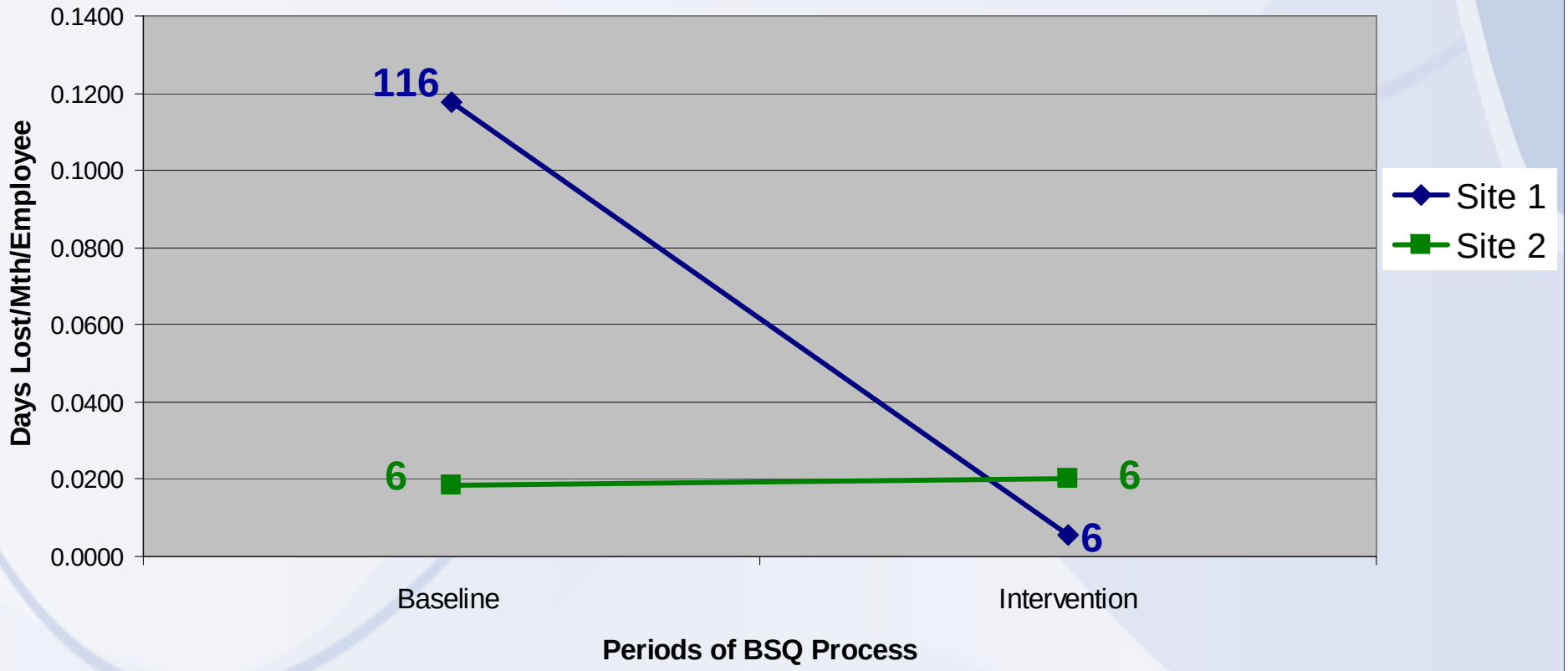
Figure 7. Lost Time Accident (LTA) & Minor Accidents at Baseline and Intervention Periods



- The accident data shows insignificant changes. For example, the lost time accidents have increased and decreased by 1 accident at either site. This insignificant data is due to a consistently low number of accidents year on year.
- Call for better (leading) indicators

KPI: LOST DAYS

Figure 8. Days Lost from Absence of an Employee Due to an Accident during Baseline & Intervention Periods



- The lost days may be skewed due to one or two operatives having a high no. of days off due to injury.

CONCLUSION

•Nevertheless, the tangible data indicates that at both sites:

-No. of key unsafe acts has decreased (increase in BSI % between baseline and intervention periods)

-There has been a decrease in minor accidents

-There has been a decrease or no change of days lost due to injury.

•Workable method for industry

•Encouraging implications for self reporting safety behaviours

-worker buy-in of the self-report

-the increase in BSI (led by a majority of self-reports);

-substantial no. of at-risk behaviours reported in the self-report checklists.

•Accuracy of self report?

•“self-monitoring alone lacks the accuracy and credibility of a more objective observational system” (Hickman and Geller, 2003)

•Combination of peer and self-reporting

•Further measures of evaluation, including leading indicators