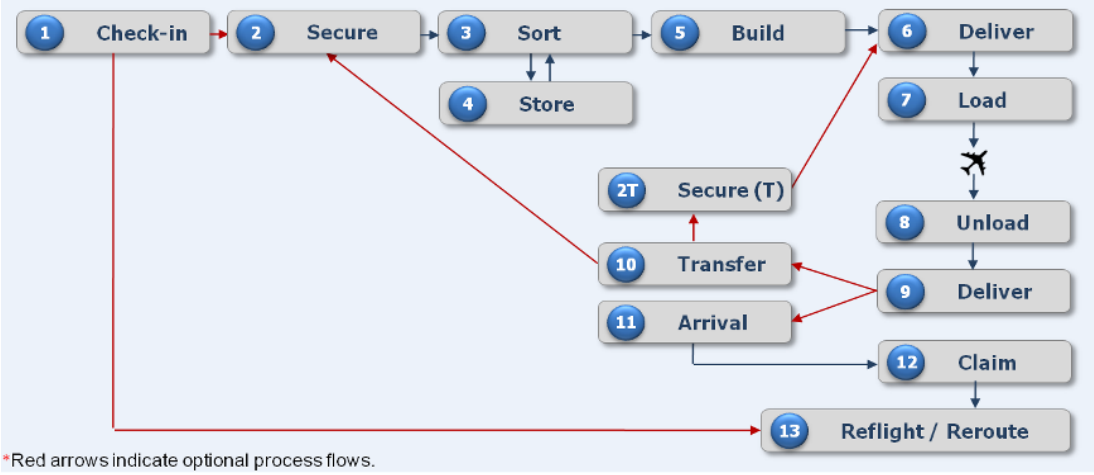
Baggage Disruption

Handling guidelines

2014

Introduction

The baggage journey is a complex one. Once a bag is checked in, either with an agent or an automated bag drop, it has to go through a number of systems and processes before it is ultimately loading into a container or hold. And for transfer bags, the process can be even more convoluted.



Reference: IATA Baggage Book (http://www.iata.org/publications/Pages/baggage-book.aspx)

Such a complex process is always at the mercy of external influences. Airports are complex environments, and can be affected by many issues, from exceptional weather and industrial action to failure of essential IT systems. Any of these issues can lead to disruptions in the baggage process, and airports without plans in place to handle these disruptions can soon find themselves dealing with a “baggage mountain” (surplus of unhandled bags) or ending up on the local television news.

This document is intended to help minimise the effect of disruptions to the baggage process. Following the guidelines contained in this document will help airport operators, airlines and ground handlers to:

- Assess the severity of a disruption event and decide how to deal with it
- Put an action plan in place to deal with unavoidable disruptions such as weather delays
- Put procedures in place to minimise the impact of avoidable disruptions such as IT failures

The document is not intended to be a set of instructions; it has been created to provide examples of best practise in the aviation industry. Some of the recommendations in this document may not be appropriate for your airport or operation; most will need to be adapted in order to be applicable.

The document was created by the Baggage Disruptions Sub Group, which was formed at the IATA Baggage Working Group in Prague in October 2013. It comprises a number of experts from airlines, airports and airport suppliers who have combined their knowledge and expertise in order to create a set of recommendations for both avoiding disruptions, and handling those disruptions over which you have no control.

The group would welcome feedback on the document; either on ways in which it can be improved, or, more importantly, on how you have used the information contained within to improve your operation and minimise the impact of disruption events. This document is intended to be a living document which will be periodically updated. Contact details are available at the end of the document in Appendix B.

Defining cases of Baggage Disruption

Disruption to a baggage process can take many forms, but all have the same eventual outcome; an event which interrupts the normal, day to day operation of the baggage process which, if not effectively handled, can lead to mishandled bags, flight delays and a “baggage mountain”.

Disruptions can be categorized into two types. The first of these are avoidable disruptions. For instance, failure of an IT system that disrupts a process could be avoided by building backup systems into the process; by ensuring adequate spares are available; or by implementing regular drills to ensure backup process are well understood by all staff.

The second type is unavoidable disruptions. For instance, the late arrival of an inbound flight due to weather delays is an unavailable disruption. The handling of this type of disruption is different; it may involve manual processes, temporary storage facilities; or ‘firebreak’ processes (cancellation of flights for a fixed period to allow systems and processes to recover).

In both cases, though, a clear action plan is essential. Whatever the type and severity of disruption, it is vital to have a communications plan in place to the right people can assess the disruption and make the right decision to minimize the impact of the event.

Preparation

Communication

In order to effectively respond to a disruption and avoid the creation of a “baggage mountain”, it is essential to have a contingency plan in place. The plan should be created and maintained by all stakeholders, which will probably include airlines, airports, handlers and suppliers.

The key to success is not only setting up a contingency plan but also exercise it on a regular basis. Working collaboratively will improve communication and in turn improve operational performance during a disruption.

Organizations should adopt the CRISIS principles after setting up Contingency plans so all stakeholders know exactly when and how to respond to a disruption.

- **C**ontinuous improvement
- **R**egular practice
- **I**nstructions and rehearsals
- **S**tructure maintained within the organization
- **I**ntegrate into the organization
- **S**takeholder collaboration

The Contingency plan outlines the steps that need to be taken in the event of a disruption. It will define examples of trigger events, decision points and escalation paths, and the stakeholders responsible for each of those.

- A trigger event is a point at which the plan transitions from one phase to another.
- At a decision point the plan demands that a decision must be made.
- An escalation path ensures that the correct stakeholders are informed, especially those from whom a decision is required.[1]

Continuous Improvement

The Contingency Plan must be regularly reviewed and potentially updated following any changes to infrastructure, process and organizational structure that could impact baggage handling. It is important to ensure a review process is in place to gather essential feedback after planned rehearsals or real life disruption.

Regular Practice

Once the Contingency Plan has been defined it is essential that all stakeholders are both familiar with the plan and its execution. This should comprise formal training as well as regular rehearsals. For instance, staff must be familiar with manual handling processes and other fall back procedures that are required during IT failures.

The Contingency Plan may also mandate preventative maintenance tasks, such as ensuring spares are available and operational.

[1] Note: Contingency Plan should focus on job roles rather than individuals. The job role could also be performed by an individual who is undertaking an exceptional role. Regular resource planning (outside of a disruption scenario) should ensure those roles can be fulfilled at all times.

Instructions and Rehearsals

It is recommended that instructions and rehearsals are scheduled to achieve maximum staff coverage.

Structure maintained within the organizations

Once the Contingency Plan is created it should be considered part of regular business operations, i.e. part of everyday life. For example, for training it should consider new comers to the organization plus refresher courses on a regular basis.

Integrate into the organization

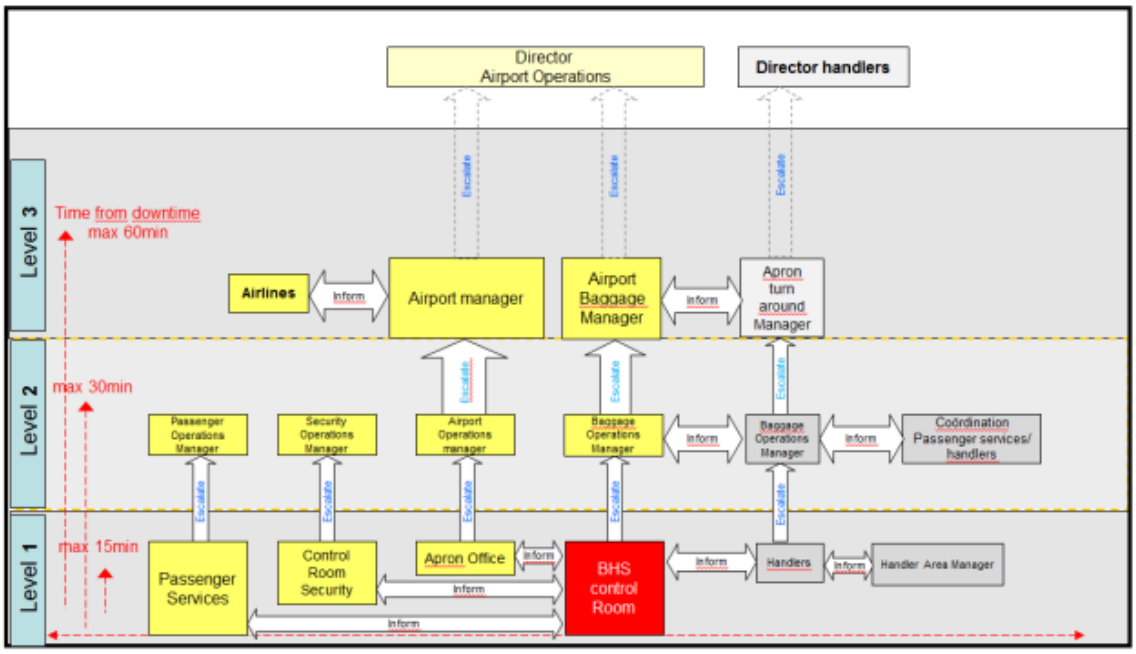
The Contingency Plan should be sponsored by senior level management of all stakeholders to ensure overall internal acknowledgment of the plan.

Stakeholder Collaboration

When problems arise across various systems that affect multiple stakeholders there should be an open approach. It is important to concentrate on problem resolution rather than apportioning blame.

While the crisis persists members of the collaborative team will contribute their expertise in order to effectively resolve the disruption.

Example of a communication plan (for a large airport)



Examples of Trigger points (for large airports)

The Contingency Plan will contain a number of trigger points which govern how the contingency plan is executed. These trigger points can be defined in a number of ways.

A number of example trigger point metrics are shown below. The values listed below will be different depending on the baggage flow and operational systems in place; other examples of metrics may also be relevant for an individual airport (e.g. multi-terminal airports may have trigger points that determine when other terminals should be informed of an outage or issue that affects only a single terminal).

1. Baggage volumes and trigger indicator

Trigger	Number of bags backing up per xxxxx mins	Action
White	Less than 50	No action required (normal operation)
Green	50-300	Check the Communication plan, investigate and monitor
Amber	300-600	Follow the Communication plan
Red	over 600	Escalate as per the Communication plan

2. Duration of failure

Trigger	Duration of failure (mins)	Action
White	less than 15	No action required (normal operation)
Green	15-30	Check the Communication plan, investigate and monitor
Amber	30-60	Follow the Communication plan
Red	over 60	Escalate as per the Communication plan

3. Scope of failure (e.g. IT failure)

Trigger	Scope of failure	Action
White	Discrete (e.g. failure of scanner, printer, Common Use kiosk)	Use alternative equipment (if available); change desks
Green	Localised (loss of wireless Access Point, shared printer)	Use alternative equipment if available. Check the Communication plan (and invoke if necessary), investigate and monitor.
Amber	Major failure (e.g. network outage in terminal, failure of a single system)	Follow the Communication plan; escalate to level 2 immediately if necessary
Red	Critical failure (e.g. airport-wide IT failure, severe weather disruption)	Escalate as per the Communication plan

Categorisation

A clear distinction can be made between unavoidable and avoidable cases. In general, the avoidable cases become unavoidable when the correct steps are not followed. Different categories are described further in this document.

Avoidable

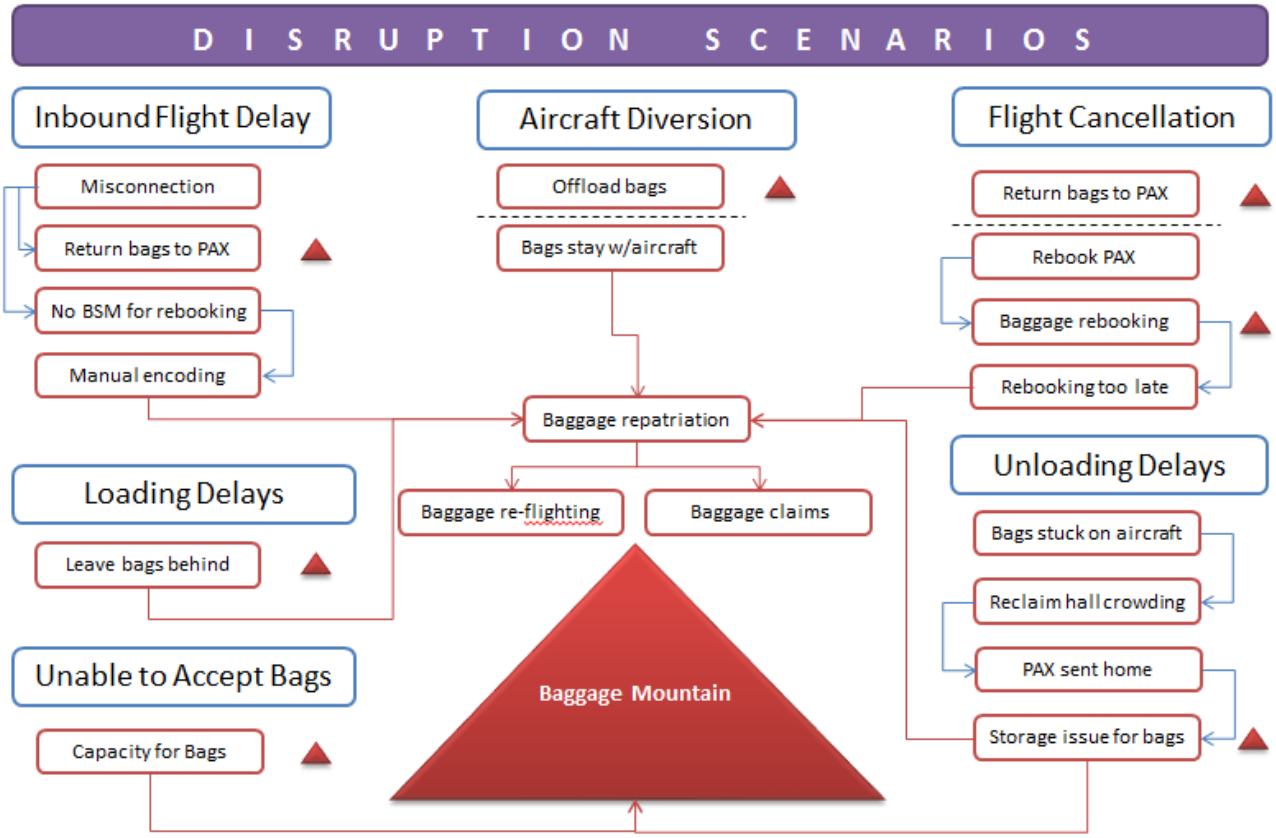
Disruption events can sometimes be avoided if the right processes, procedures and systems are in place to enable that part of the baggage journey to be handled by other means. For example:

- Failure of a system that disrupts a process could be avoided by building in redundancy, such as backup servers, network storage, or dual redundancy of baggage lines, power supplies or access points.
- Failure of individual pieces of equipment can be avoided by ensuring adequate spares are available; or by implementing regular rehearsals to ensure backup processes are well understood by all staff.

Unavoidable

An unavoidable disruption is a disruption over which stakeholders have no control. For instance, the late arrival of an inbound flight due to weather delays is an unavoidable disruption. The handling of this type of disruption is more reactive but this doesn't mean procedures cannot be put in place to minimize the impact of the disruption.

The flow diagram below helps identify at which point a "baggage mountain" could start, which is indicated by the small red triangles.



The following sections give more details on some specific types of avoidable and unavoidable disruptions. For avoidable cases there are clear mitigating actions to help prevent the disruption however, for unavoidable cases the focus centres on resolution of the “Baggage Mountain”. This will be further described in the final chapter of this document.

Each event is divided into a number of sections:

- **Scenario**: the issue that causes the disruption
- **Effect**: the impact that the disruption has (or could have) on the process or operation
- **Cause**: details of the event, including likely causes (which can in themselves be sometimes prevented)
- **Mitigation (for avoidable cases)**: the steps that should be taken in order to minimize the impact of the disruption
- **Notes**: any additional information

Although not stated, disruptions that are not contained will inevitably lead to invoking the Contingency Plan.

Bag Tag Print Quality

Scenario: Handling and reconciliation systems have issues reading printed barcodes due to poor bag tag print quality

Effect: Localised impact. Handling systems cannot read barcodes; more bags will be sent to manual encoding stations, dump chutes or problem bag areas, resulting in an increase in mishandled bags. Reconciliation systems cannot read barcodes, resulting in more manual entry and ultimately flight delays. Misreads, while unlikely, may also be possible, resulting in incorrect loading.

Cause: Ink running low in bag tag printers; damaged or dirty print heads; damaged or dirty print rollers; faulty equipment. For thermal heat transfer printers, storage, environmental issues or friction may degrade print quality

Solution, resolution or mitigation:

1. Preventative measures:
    a. Include print test in Standard Operating Procedures – test print should be issued and visually checked at start of every shift and following every change of stock (print errors are normally obvious due to tramlines on horizontal barcodes and through printed text)
    b. Ensure printer ID is included on every printed bag tag (as per IATA guidelines) to provide traceability
    c. Ensure first line support includes preventative maintenance (print head clean etc) in accordance with manufacturer's guidelines. In potentially dirty or dusty areas, consider dust covers or shrouds
    d. Implement random audits [SP editorial – this came from the meeting but not sure about this – if there's no issue, a random audit won't reveal anything; if there's an issue, we'll already know. Unless we suggest random audits to inspect the test print at random times during a shift to ensure it's been done? But normally it will have been discarded]
2. Reactive measures:
    a. Analyse information from manual encoding stations, either using existing systems or new procedures (examples: store bingo stub on a separate sheet for misreads; store suitable reason code and generate reports in existing manual encoding systems.)
    b. For local bags, set actions / targets to reduce manual encoding rates due to faulty bag tag prints on-airport as an SLA
    c. For transfer bags, use analysis to identify and report to origin station. Include pictures if possible

Notes:

- Printed tags must adhere to Baggage Tag Media Quality Guidelines in IATA Passenger Services Conference Resolutions Manual RP1740.
- This information could be stored long-term in a baggage broker or data warehouse system.

Hand Scanner Failures

Scenario: Where reconciliation, reflighting or manual encoding relies on hand held scanners, these scanners fail.

Effect: Depends on failure. Individual scanner failure will have a discrete impact provided spares are available. Issues affecting multiple scanners will be localised or may be major in the event of terminal- or airport-wide WAN failures.

Cause (example 1): Individual scanner outage

Mitigation:

- Ensure suitable spares holding to allow immediate replacement (usually around 10% spares holding is adequate).
- Ensure preventative maintenance is in place to reduce unnecessary breakage.
- Consider use of ruggedized cases, holsters, shoulder straps etc.
- Ensure suitable warranty is in place. Note that 'Gold' rapid response warranties are not always necessary if spares holding is adequate

Cause (example 2): Localised scanner outage due to partial wireless network failure (e.g. single access point)

Mitigation:

- Ensure overlapping coverage from adjacent access points (discuss with network provider and/or airport)
- Instigate action plan to move to adjacent areas with working coverage if feasible; or consider swapping flights with 'simpler' requirements to areas where scanner access has failed, allowing larger or more complex loads where scanner access is available
- Instigate action plan to go to manual loading (either using hand held scanner batch mode if available or manual loading via bingo sheets if not). Practise manual/batch loading regularly (at least monthly, ensuring all shifts are included by rotation) to ensure procedure is understood when required.

Cause (example 3): Major or critical outage due to total wireless network failure

Mitigation:

- Instigate action plan to go to manual loading (either using hand held scanner batch mode if available or manual loading via bingo sheets if not). Practise manual loading regularly (at least monthly, ensuring all shifts are included) to ensure procedure is understood when required.
- Consider invoking airport-wide disruption procedures if outage is deemed severe or likely to persist.

Notes:

- Other Business Continuity solutions may be available. Consider:
    - Mi-fi (http://en.wikipedia.org/wiki/MiFi),
    - 3G access from scanners directly to cellular network
-

Missing BSMs

Scenario: BSMs are missing from systems that require BSM information to process bags.

Effect: Bags will be misrouted by the handling system to the dump chute, manual encoding station or problem bag areas. Bags will not be loadable by the reconciliation system. Information will not be available to reflighting or other airport information systems.

Discrete or localised issues (e.g transient outage) will cause increased mishandling and may cause flight delays as bags are traced. Major or significant issues could result in a baggage mountain and will probably trigger airport-wide disruption procedures.

Cause: Causes are variable. Impact is likely to be low for individual issues; repeated issues, or IT-related outages, are likely to have a much wider impact.

Example causes:

- Addressing issues (BSM sent to wrong address)
- Transfer BSMs not handled correctly by host (see Appendix A)
- Multiple BSMs (duplicated or with variations) sent for the same bag
- Confusion in passenger rebook process (often because of the lack of a process)
- IT failures:
    - network outages;
    - Message Delivery System outages;
    - queuing issues
    - DCS outages (especially for dominant airlines; e.g. BA at LHR, DL at ATL, or where a DCS serves multiple airlines from the same host)
    - Sortation or Reconciliation system outages
- Rejection of BSMs due to issues when processing non-mandatory elements
- Spurious delivery issues (random delivery failures)

Mitigation:

1. Analyse available information to help identify causes and patterns. Information could be available from several sources:
    a. Manual encoding stations / problem bag areas
    b. BSM rejections logs for BHS and BRS
    c. Rejected Scans logs for BRS

    Commonly occurring issues should be reported to the appropriate parties. Suppliers should be encouraged to both proactively check their own logs and to supply these logs to airport or AOC staff when requested.
2. Ensure adequate training and information available for staff. Examples:
    a. BSMs should be generated when adding RUSH tags to a flight
    b. GATE bags should be tagged and added to the passenger DCS record to generate messages. Also if the customer is connecting to another flight the bag should be tagged to the final destination.
    c. Pushchairs, wheelchairs etc. should be tagged at check-in so the reconciliation system knows to expect these bags at the gate. If the items can then be accommodated on board the aircraft, the tags should be removed and deleted from the passenger DCS record.

    d. 10-digit license plate awareness needs to be communicated to all agents handling baggage especially those who need to manually enter baggage details into any system.
3. Ensure suitable Business Continuity plan is in place for significant outages (e.g. network failure, MDS failure). This will invoke airport-wide disruption procedures and may include airport-wide manual handling or implementation of a firebreak (blanket flight cancellation over a short period) to reduce baggage mountain

Baggage Handling System Failures

Scenario:

BHS outages can be caused by a number of events:

- Power failure
- Operating system failure
- Network failure
    - System network failure
    - Security network failure
- Outage caused by improper usage

Power failure

Most handling systems are equipped with emergency power systems which will take over in case of power failure. A power failure will affect the operating system and network as well. Depending on the duration of the power failure, systems will likely have to be rebooted. This might result in a short term outage of the baggage handling system which will not require any action. However, in case of long term outage of the baggage handling system action will be required. (As shown in “Examples of Trigger points” section of this document.)

Operating system failure

Operating system failure can occur at any time. It is important that systems have built in redundancy. An operating system failure can either affect systems airport wide or in certain areas. Either scenario needs different approach.

Network failure

Network failure results in no communication between two or more different systems, which is especially problematic in case security screening machines.

Outage caused by improper usage

Improper usage of the BHS like inserting odd size or baggage which does not meet the BHS requirements can cause the system to crash.

Effect:

All scenarios will result in a non-operating BHS. It will not be possible to process Check-in, Transfer and Reclaim baggage automatically. This can easily lead to the creation of a “baggage mountain”, depending on the duration of the outage. Required actions depend on whether the impact is airport wide or affects only certain areas.

Cause:

- Non-operating or non-existing emergency power system
- Lack of redundancy
- Poor maintenance
- Improper usage by handler

Mitigation:

Common solutions in case of BHS failure are listed below. The use of those depends on an actual situation.

- As soon as a power failure or BHS operating system failure occurs over a longer period of time, the emergency communication and contingency plans should be activated
- If available make use of Fall back Tag procedures
- In case of a local outage move to alternative areas if available
- Handler should start manual sorting
- Prioritize sorting of short connection baggage
- Set up areas for mishandled bags to be stored and focus on remaining bags
- Using IT baggage solutions like wireless scanners/ printers for forwarding
- To reduce impact on passenger flows at departures use manual handling processes
- In case of airport wide outage make use of alternative means of transport to the baggage handling area (elevator, odd size facilities)
- Passenger should take cabin sized bags as carry-on items to the gate as much as possible
- If available make use of a contingency team and/or office personnel
- In case of flight cancellation return bags to passenger if possible

Unavoidable Disruptions

Weather

Scenario: Extreme Weather Conditions, such as high wind, rain, hail storms, snow, ice and fog can have an impact on baggage handling and processes. This is not limited to local weather conditions only.

Effect:

- Delayed baggage
- Mishandled baggage
- Additional Ground transport of bags
- Additional Costs for baggage deliveries and first need items
- Creation of a “Baggage Mountain”

Cause:

- Loading /Off-Loading processes become difficult to impossible
- Weight /Space restrictions
- Flight Diversions due ATC instructions and/or Airport closure
- GHA Resources: Staff and/or equipment shortage

Mitigation:

Create and implement action plan, paying particular attention to weather issues in the host airport (e,.g. snow/ice, dust, sever winds etc).

Sudden Industrial action

Creation and implementation of a Contingency Plan is the best defence against sudden industrial action. The effect on the baggage process will vary depending on the industry group taking the action. No specific effects have been listed in this document; although many of the scenarios above will also apply to operational issues following industrial action.

Returning of bags following cancellation

When a flight is cancelled, or delayed overnight, bags should be returned to the passengers. This can cause disruption and confusion, especially if local ground staff aren't aware of the process for returning bags. A simple process of always using the same lateral for returning cancelled bags can help reduce this confusion, as passengers can always be directed to that single point, and ground staff will know where any unclaimed bags will be loaded.

Unpredictable events

Consideration should be made for handling unpredictable events. For example, the disruption following the restrictions placed on carriage of liquids in cabin baggage could not have been reasonably predicted; however, airports with a well understood and properly implemented contingency plan would have been better equipped to deal with this sort of event.

Resolving the “Baggage Mountain”

Inevitably, some disruption will result in creation of a “Baggage Mountain”. At this stage, it is essential to follow the Contingency Plan in order to reduce the backlog as effectively as possible. The precise steps required to achieve this will vary depending on the Contingency Plan; it is clearly essential to make sure that a process in place to identify that a baggage issue may occur (or has occurred) and that the plan is actually invoked.

The following suggestions might help when producing the Contingency Plan for reducing a “Baggage Mountain”.

- Define an adequate work area or areas (probably airside) where a “Baggage Mountain” can be stored and processed in a timely manner (segregation and mobile workstations are recommended). Multiple areas can be allocated for different scenarios, terminals or airlines; these areas should be permanently defined if possible.
- Identify bags as they go into the baggage mountain using appropriate tools (for instance tracking into holding areas or creation of ‘On Hand’ messages)
- Use available automated tools for tracing, tracking and repatriation (forwarding)
- Explore increasing expiration period of BIMs, PNRs and other messages to ensure information is not lost. This applies to airport handling, reconciliation and repatriation systems as well as airline departure control systems
- Ensure availability and familiarity with the Flight plan/schedule (for forwarding bags)
- Explore possibility of calling in additional resources
- Consider the customer service impact of contingency plan actions

Glossary

Avoidable disruption	A disruption to the baggage process that could potentially be prevented; e.g. disruption following an IT failure can be avoided by having appropriate backup systems or spares
Baggage Mountain	An unusually large surplus of unhandled bags caused by a disruption event
BHS	Baggage Handling System. Can include the Sort Allocation Computer (SAC) as well as belts and laterals
BIM/BSM/BPM	IATA Bag Information Messages (e.g. Baggage Source Messages, Baggage Processed Messages)
BRS	Baggage Reconciliation System. Has responsibility for correctly reconciling bags onto a flight as per load instructions from the DCS and external security systems
Contingency plan	An action plan outlining trigger points, decision points and escalation paths which can be followed in the event of a disruption
DCS	Departure Control System. Amongst other uses, used by airlines to define the bags to be loaded onto a flight
Decision Point	A point in the contingency plan which demands that a decision must be made
Escalation Path	A communications hierarchy which ensures correct and appropriate stakeholders are informed of a disruption at each trigger or decision point
Firebreak	A fixed block of cancelled operations used to allow the baggage process to recover (or partially recover) from a disruption event
PNR	Passenger Name Record. Used to identify a passenger booking; generally will persist longer than a BSM.
Stakeholder	A party with an interest in the baggage process. This can include airports, airport operating committees, airlines, ground handlers, security organisations, and IT and system suppliers
Trigger Point	The point at which a plan should transition from one phase to another
Unavoidable disruption	A disruption to the baggage process that cannot be prevented; such as a weather delay

Appendix A – Late BSMs

A companion document, 'Late BSMs at LHR', was created by John Sheppard and presented at BWG23 in YUL in 2011. It outlines a number of issues with BSM delivery that affected LHR, and the steps taken by HAL (Heathrow Airports Limited; formerly BAA, the British Airports Authority) to resolve these.

Some of the issues outlined in the document aren't disruptions as such, because they occur many times a day, and are almost accepted as part of normal operations. The effect of these messaging issues can have a disruptive effect, however, and should be considered as part of any process improvement programme.

Appendix B – List of contributors

IATA would like to thank the following contributors to Issue 1 of this document:

Remco Rooij	Schiphol Airport	rooij_r@schiphol.nl
Robert Young	Amadeus	robert.young@amadeus.com
Shaun Penton	Ultra Electronics	Shaun.penton@ultra-as.com
Marillia De Oliveira	TAP, Portugal	mcdoliveira@tap.pt
Silvia Klug	Air Berlin	Silvia.Klug@airberlin.com
John.Shepperd	SITA	John.Shepperd@sita.aero
Brenda Hughes-White	British Airways	brenda.hughes-white@ba.com
Peter Ball	Zafire	PBall@zafire.com
Rolanda Gould	Heathrow Airport AOC	rolandagould@AOC-LHR.co.uk
Blanka Svobodova	IATA	svobodovab@iata.org
Andrew Toumazi	IATA	toumazia@iata.org