

Introduction

The Exchange thanks Honourable Members of the Panel for the opportunity to explain the temporary disruption of trading terminals on 8th February and to answer their questions and hear their views and comments on the incident.

This paper will look at: the causes of the disruption; the impact on the market; the immediate remedial action that was taken; and the further follow up action that is being taken to avoid a repetition of such an incident in the future.

Before entering into this explanation, the Exchange would firstly like to express its sincere regret to all those who suffered inconvenience as a result of the incident.

Description of the market disruption

There were two aspects to market disruption on 8th February which will be discussed in turn: firstly, the temporary interruption to trading that began at 15:08 and lasted about twenty minutes after that; and secondly the failure of the trading system to shut down at normal close of trading which should be exactly 16:00.

For the first aspect, the sequence of events was as follows:

1. A power trip affected electricity supply by Hong Kong Electric to the Exchange's computer room in Exchange Square.
2. The automatic triggering of the Exchange's Uninterrupted Power Supply (UPS) to protect computer systems which in turn allowed the trading system to continue normal operation; and at the same time the alarm bell of the UPS was triggered.

3. The triggering of the Emergency Stop button of the UPS system as opposed to the button to silence its alarm bell.
4. With the UPS system stopped, power supply was cut off to the entire Exchange Square data centre including the AMS trading system host computer, all trader PCs in the trading hall and the telecommunications facility for off-floor trading terminals.

Pausing at this stage of events, the Exchange would emphasize a number of points:

- a) Power trips of city electricity supply are a pretty common occurrence so the Exchange's UPS system is brought into operation quite often: 8 times in the course of 1999, not including trials and rehearsals.
- b) There are therefore standard operating procedures for UPS: in this incident, these procedures were followed except that the Emergency Stop button of the UPS was accidentally pressed when the action required was simply to switch off the alarm bell.
- c) Not only are procedures standardized, rehearsed and in regular use, those involved are qualified for their job functions including what is required for implementation of these procedures.
- d) The UPS controls and the alarm bell controls are all housed in the Exchange's control room: access to this room is confined to authorized persons.

The AMS host computer was able to continue to run on its internal battery so data was not lost and trading memory was maintained. With AMS order books maintained in this way, trading could start operation immediately when electricity supply resumed and terminals were booted up again.

To resume the description of events:

1. So, trading on all terminals was disrupted: the floor manager announced in the trading hall that the interruption was due to power supply failure.
2. Within five minutes of the interruption, the Contingency Management Team of the Exchange was assembled and normal emergency procedures took over.
3. The UPS back up power system was then quickly reactivated as the accident in shutting it down had been immediately realized and remedial action initiated.

The cut off of UPS power at 15:08 meant an immediate stop to all trading terminal activities. When UPS power came back at around 15:13, first terminals (on-floor terminals) in the Trading Hall began to boot up automatically and to re-establish their AMS connection. At 15:30, over 90 per cent of the first terminals had completed their AMS connection automatically.

Hong Kong Telecom reset the network equipment to connect second and third terminals (off-floor terminals) which then recovered progressively.

This brings us to the second aspect of market disruption: namely, the failure of the trading system to shut down at normal close of trading which should be exactly 16:00.

In relation to this delay in closing the market, the sequence of events was as follows:

1. The Contingency Management Team decided to maintain the normal trading hours and allow AMS to close the market at 16:00. It is worth noting that trading hours have never been extended beyond the scheduled timetable since introduction of the AMS trading system in 1993. For any extension of trading hours, the Exchange has to follow a laid-down procedure according to the rules.
2. A reminder to this effect was immediately disseminated to all relevant parties including the regulator. An announcement was made in the trading hall that the market would close at 16:00 as normal. The same message was sent to members via the dedicated emergency pagers which are attached to second terminals and email messages to all members. This communication was backed by announcement on Teletext.
3. Straight after the scheduled market close, it was discovered that trading activity was still taking place. Immediate investigation established that AMS had not stopped the market at 16:00 and that trades were executed until 16:04 when the market was finally stopped by the AMS host system.

The delay in closing the market was due to the accidental cut-off of UPS power supply to the AMS host system. When there is such a power cut-off, the AMS host system immediately switches to internal back-up battery and thereby continues to function. In spite of this, the timer to close the market failed to activate when the clock hit 16:00. Such an effect on a system timer was unexpected and has never before been documented either by the AMS host system developer or by the manufacturer of the system.

Following the close of the market, the Exchange began an examination of the AMS database to assess the nature and extent of trading that had taken place after 16:00. This examination was completed at around 17:30. It was concluded that the additional trading after 16:00 had involved 1,099 trades (0.46 per cent of total for the day) amounting to a turnover value of HK\$107,624,667 (0.58 per cent of total for the day) and 80,290,002 shares (0.43 per cent of total for the day).

The Exchange then informed the regulator and announced to members and the media that trades executed after 16:00 would not be recognized by the Exchange. (This accords with Exchange rules that trading that takes place outside of the stipulated trading hours will not be recognized.) The accuracy of the trade data and closing prices recorded in AMS was verified and end-of-day trading record files were released to members electronically. Relevant members were also contacted to reconfirm details of trades concluded after 16:00 and to advise again that those trades would not be recognized and would be cancelled. They were also advised to inform their clients accordingly. In addition, a press announcement was made immediately afterwards to inform the public of the arrangements.

Immediate and longer term follow up action by the Exchange

The Exchange recognizes room for immediate improvement in procedures for dealing with future disruptions to both the external power supply and the trading system.

The following measures have already been taken:

- ◆ In future, operation of and access to the UPS system will require at least two persons who are appropriately qualified and experienced.
- ◆ An immediate refresher briefing has been given to all technical staff on the procedures for handling UPS in general and in particular under emergency situations.
- ◆ In future, in the event of similar power interruption to the AMS computer system, the market close mechanism for AMS will be switched from automatic control mode into a manual control mode. This manual mode is a standard function and is well tested in past rehearsals.

The Exchange is experimenting with more indicative signs for UPS to alert operators of the system most effectively in both normal and emergency situations.

For longer term improvement, the Exchange will appoint an independent consultant to review the system processes for handling the abnormal suspension of UPS and similar emergency situations in collaboration with the AMS host computer manufacturer.

The Exchange's position on the incident

The Exchange would like to summarize its view of the incident. After the incident had taken place, the Exchange believes that remedial action was taken in an expeditious, efficient and professional manner. Certainly, there is room for improvement in our precautionary measures and we will be considering very

carefully what lessons we can draw from this experience. However, our crisis management procedures were in place and were brought into operation quickly and effectively.

Secondly, the Exchange would like to emphasize its overriding objectives at all times during this incident and other emergency situations. Maintenance of - or rapid return to - normal market operation is certainly paramount. In addition, minimizing market confusion is of vital importance: this consideration was behind much of the action of the Exchange in dealing with the incident. Both of these considerations were key to the decision to maintain continuous trading during scheduled trading hours.

Finally, it is a central philosophy of the Exchange that all market participants must be made aware of events clearly and quickly so that they can make their own trading decisions. In line with this philosophy, the Exchange has established reliable channels for communication for emergency circumstances. During this incident these channels were used according to plan.